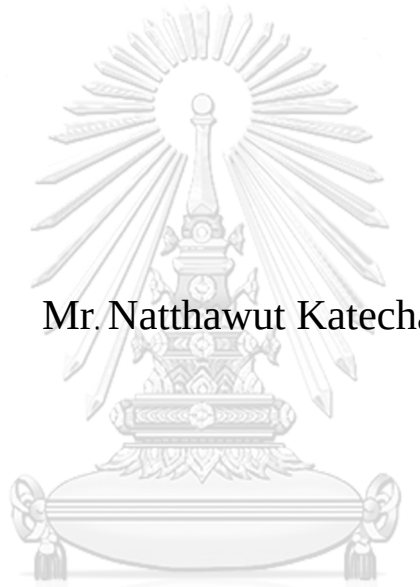
PRIVATE SCHOOL TEACHER DEVELOPMENT MODEL BASED ON THE CONCEPTS OF TPACK AND PRODUCTIVE PEDAGOGIES

Mr. Natthawut Katechaiyo



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รูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ

นายณัฐวุฒิ เกตุไชโย

จุฬาลงกรณ์มหาวิทยาลัย
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วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาครุศาสตรดุษฎีบัณฑิต
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ณัฐวุฒิ เกตุไชโย : รูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ. (PRIVATE SCHOOL TEACHER DEVELOPMENT MODEL BASED ON THE CONCEPTS OF TPACK AND PRODUCTIVE PEDAGOGIES) อ.ที่ปรึกษาหลัก : ศ. ดร.พฤทธิ์ ศิริบรรณพิทักษ์, อ.ที่ปรึกษาร่วม : ผศ. ดร.นันทรัตน์ เจริญกุล

การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อศึกษา 1) กรอบแนวคิดการพัฒนาครูและแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ 2) ศึกษาสภาพปัจจุบันและสภาพที่พึงประสงค์ของการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ 3) พัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ โดยใช้ระเบียบวิธีวิจัยแบบผสมวิธีพหุระยะ ประชากรคือโรงเรียนในสังกัดคณะกรรมการส่งเสริมการศึกษาเอกชนจำนวน 3,776 โรงเรียน ขนาดของกลุ่มตัวอย่างคือ 163 โรงเรียน และทำการสุ่มแบบหลายขั้นตอนโดยแบ่งโรงเรียนตาม ภาค สถานที่ตั้งในเมืองและนอกเมือง ขนาด ผู้ให้ข้อมูลคือ ผู้บริหารสถานศึกษาโรงเรียนสังกัดสำนักงานคณะกรรมการส่งเสริมการศึกษาเอกชน จำนวน 163 คน และครูที่ทำการสอนไม่ตรงวิชาเอกหรือไม่ได้จบศึกษาศาสตร์ภายในโรงเรียนจำนวน 163 คน รวมจำนวนทั้งสิ้น 326 คน เครื่องมือที่ใช้ในการวิจัยและการเก็บข้อมูลคือ แบบประเมินกรอบแนวคิด แบบสอบถาม แบบประเมินความเหมาะสมและความเป็นไปได้ของร่างรูปแบบการพัฒนาครู และการสนทนากลุ่มผู้ทรงคุณวุฒิ การวิเคราะห์ข้อมูลเชิงปริมาณ ด้วยสถิติเชิงพรรณา ได้แก่ ความถี่ ค่าเฉลี่ย ร้อยละ ส่วนเบี่ยงแบนมาตราฐาน และดัชนี $PNI_{Modified}$ วิเคราะห์ข้อมูลเชิงคุณภาพด้วยการวิเคราะห์เนื้อหา

ผลการวิจัยพบว่า 1) กรอบแนวคิดรูปแบบการพัฒนาครูประกอบด้วย 3 รูปแบบหลักและ 9 รูปแบบรอง ส่วนกรอบแนวคิดองค์ความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา (ทีแพค) ประกอบด้วย 7 ด้าน และกรอบแนวคิดศาสตร์การสอนที่มีผลิตภาพประกอบด้วย 4 มิติหลัก 22 องค์ประกอบย่อย 2) สภาพปัจจุบันของรูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพโดยรวมอยู่ในระดับสูง ส่วนสภาพที่พึงประสงค์โดยรวมอยู่ในระดับสูงเช่นกัน เรียงลำดับค่าเฉลี่ยจากสภาพปัจจุบันและสภาพที่พึงประสงค์เหมือนกันจากมากไปน้อยในด้านรูปแบบหลักตามลำดับคือ รูปแบบการถ่ายทอด รูปแบบการเปลี่ยนผ่าน รูปแบบการเปลี่ยนแปลง เมื่อพิจารณาความต้องการจำเป็นร่วมกับองค์ความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา และศาสตร์การสอนที่มีผลิตภาพพบว่ารูปแบบการเปลี่ยนแปลงเป็นรูปแบบหลักที่มีความต้องการจำเป็นสงสุดประกอบด้วยรูปแบบการวิจัยเชิงปฏิบัติการและรูปแบบการเปลี่ยนแปลง รองลงไปคือรูปแบบการเปลี่ยนผ่านประกอบด้วยรูปแบบชุมชนนักปฏิบัติและรูปแบบการโค้ชและพี่เลี้ยง 3) รูปแบบการพัฒนาครูโรงเรียนเอกชน ที่พัฒนาขึ้นคือ “รูปแบบการเปลี่ยนแปลงทีแพคและศาสตร์การสอนที่มีผลิตภาพ” (TPACK & Productive Pedagogies Transformative Model) ประกอบด้วย 4 องค์ประกอบคือ (1) รูปแบบการพัฒนาครูเน้นรูปแบบการเปลี่ยนผ่านและการเปลี่ยนแปลง (2) มุ่งพัฒนาองค์ความรู้บูรณาการของเทคโนโลยี ศาสตร์การสอนและเนื้อหา 4 ด้านโดยมีความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา (3) มุ่งพัฒนาศาสตร์การสอนที่มีผลิตภาพ โดยเน้นคุณภาพทางปัญญา คือการพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์อย่างลึกซึ้ง ความรู้เชิงลึก และความรู้ที่เป็นปัญหา กับสภาพแวดล้อมห้องเรียนที่เอื้อต่อการเรียนรู้ คือการกำกับตนเอง การมีส่วนร่วมทางวิชาการอย่างลึกซึ้ง และนักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้ (4) มุ่งยกระดับผลสัมฤทธิ์ทางการเรียนของนักเรียน

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Natthawut Katechaiyo : PRIVATE SCHOOL TEACHER DEVELOPMENT MODEL BASED ON THE CONCEPTS OF TPACK AND PRODUCTIVE PEDAGOGIES. Advisor: Prof. PRUET SIRIBANPITAK, Ph.D. Co-advisor: Asst. Prof. NANTARAT CHAROENKUL, Ph.D.

The objectives of this research is to 1) study conceptual frameworks of teacher development, TPACK, and productive pedagogies. 2) study the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies. And 3) develop a private school teacher development model based on the concepts of TPACK and productive pedagogies. This research applied multiphase mixed methods design. The population was 3,776 schools under the office of private education commission and the sample were 163 schools chosen through multi-stages random sampling method based on geographical locations, urban and rural areas, and school size. The informants were 163 school administrators and 163 out of field teachers, the total of 326 people. The research instruments used were conceptual framework evaluation form, current and desirable characteristics questionnaire, evaluation form to testify the feasibility and appropriateness of the model, and expert group conversation. Percentage, frequency, mean, standard deviation and PNI modified were used for data analysis.

The research results were as follows: 1) The conceptual framework of teacher development was consisted of 3 main models and 9 sub models while teacher's knowledge consisted of components of TPACK and productive pedagogies of 4 dimensions and 22 items. 2) The overall status of private school teacher development model based on the concepts of TPACK and productive pedagogies was at a high level; the overall desirable status was at high level as well, the main models that had highest current and desirable states were transmission model, followed by transitional model, and transformative model. The priority needs index analysis of private school teacher development model based on the concept of TPACK and productive pedagogies showed that action research model had highest priority needs, followed by transformative model, community of practice model, and coaching and mentoring model 3) The model developed was "TPACK & Productive Pedagogies Transformative Model" which consisted of 4 components as follows: (1) Teacher development emphasizes on transitional models and transformative models. (2) Development of TPACK, there are technological pedagogical content knowledge, technological pedagogical Knowledge, technological content knowledge, and pedagogical content knowledge. (3) Development of Productive pedagogies with 2 dimensions and 6 items: intellectual quality dimension items consisted of metalanguage, deep knowledge, knowledge problematic, and supportive classroom environment items consisted of self-regulation, engagement, and student control. Lastly, (4) Elevation of Student's Academic Achievement.

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Natthawut Katechaiyo

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Chulalongkorn University

TABLE OF CONTENTS

Page

ABSTRACT (THAI) iii

ABSTRACT (ENGLISH) iv

ACKNOWLEDGEMENTS v

TABLE OF CONTENTS vi

LIST OF TABLES ix

LIST OF FIGURES xiii

CHAPTER 1 INTRODUCTION 1

1.1 Problem Statement 1

1.2 Research Questions 2

1.3 Research Objectives 3

1.4 Definitions of Terms 3

1.5 Conceptual Framework 5

1.6 Scope of the Study 7

1.7 Significance of the Research 8

1.8 Expected Outcome 9

CHAPTER 2 LITERATURE REVIEW 10

2.1 Knowledge Related to Out-of-Field Teachers 11

2.2 Knowledge Related to Teacher Development Models and Practices 22

2.3 Models of Continuing Professional Development 40

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

2.4 Kennedy's Framework for Analysis of CPD Models 49

2.5 Analysis of Characteristics of Models for Professional Development Based on Kennedy Framework (2005) 49

2.6 Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge.....52

2.7 Productive Pedagogies.....57

CHAPTER 3 METHODOLOGY 62

3.1 Research Design.....62

3.2 Research Processes 62

CHAPTER 4 RESERCH ANALYSIS AND FINDINGS 75

4.1 Conceptual framework for private school teacher development based on the concepts of TPACK and productive pedagogies.....76

4.2 Current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies.....82

4.3 Private school teacher development model "ACCT teacher development model" (1st draft).....126

4.4 Appropriateness and feasibility of private school teacher development model "ACCT teacher development model" (1st draft) by experts 132

4.5 Out-of-field teacher development model "ACCT teacher development model" (2nd draft).....137

4.6 Out-of-Field Teacher Development Model "TPACK & Productive pedagogical Transformative Model" (final).....138

CHAPTER 5 RESEARCH SUMMARY, DISCUSSIONS, AND RECOMMENDATIONS.....145

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

5.1 Summary 145

5.2 Discussion of the Study 151

5.3 Recommendations 159

REFERENCES 162

APPENDIX 179

APPENDIX A 180

APPENDIX B 244

APPENDIX C 296

APPENDIX D 301

VITA 311

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

LIST OF TABLES

Page

Table 1 Statistics of Teachers with Teaching Licenses.....16

Table 2 Factors Related to Out-of-Field Teacher Development 21

Table 3 Summary of evidence-based professional learning practices and programmes 27

Table 4 Factors Related to Teacher Development Model 31

Table 5 Teachers' Factors Related to Student Achievement.....39

Table 6 Characteristics of Teacher Development Models Based on the concept of Kennedy (2005).....51

Table 7 Productive pedagogy dimensions summary table, items and key questions addressed (The State of Queensland, Department of Education, 2002) 60

Table 8 Research Sampling.....66

Table 9 Research Procedures 73

Table 10 The evaluation of (draft) conceptual framework on private school teacher development model based on the concepts of TPACK and productive pedagogies 78

Table 11 Numbers and Percentages of Sent and Returned Questionnaires from Schools under the Office of Private Education Commission 82

Table 12 General Information of School.....82

Table 13 General Information of Informants 83

Table 14 Numbers of out-of-field teachers and in-field teachers 84

Table 15 A comparison of out-of-field teachers and in-field teachers with school sizes.....85

Table 16 A comparison of out-of-field teachers and in-field teachers with geographical location.....86

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Table 17 A comparison of out-of-field teachers and in-field teachers with educational levels.....87

Table 18 A comparison of out-of-field teaching subjects and school sizes 88

Table 19 A comparison of out-of-field teaching levels and school sizes.....88

Table 20 The overall current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in different development models aspect 89

Table 21 The overall current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in productive pedagogies aspect 91

Table 22 The overall current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in technological pedagogical content knowledge 93

Table 23 Current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in transmission model by the training model.....94

Table 24 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transmission model by the award-bearing model 96

Table 25 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transmission model by the deficit model.....99

Table 26 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transmission model by the cascade model.....102

Table 27 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transitional model by the standard-based model.....105

Table 28 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transitional model by the coaching and mentoring model.....108

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Table 29 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transitional model by the community of practice model 111

Table 30 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transformative model by the action research model 114

Table 31 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transformative model by the transformative model.....117

Table 32 The overall modified priority needs index of private school teacher development model based on the concepts of TPACK and productive pedagogies 121

Table 33 The overall modified priority needs index of private school teacher development model based on the concepts of TPACK and productive pedagogies in productive pedagogies aspect. 122

Table 34 The overall modified priority needs index of private school teacher development model based on the concepts of TPACK and productive pedagogies in technological pedagogical content knowledge 124

Table 35 The overall analysis of modified priority needs index, strength, weakness, and major problems of private school teacher development model based on the concepts of TPACK and productive pedagogies 125

Table 36 Experts' numbers and fields of expertise for evaluating the appropriateness and feasibility of private school teacher development model "ACCT teacher development model" (1st draft) 132

Table 37 Experts' evaluation on the appropriateness of components of private school teacher development model "ACCT teacher development model" (1st draft).....133

Table 38 Evaluation result of appropriateness and feasibility of Private school teacher development model "ACCT teacher development model" (1st draft) by experts 134

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Table 39 Evaluation result of appropriateness of the graphic presentation of private school teacher development model “ACCT teacher development model” (1st draft) by experts 137

Table 40 Summary of focus group experts’ comments on of private school teacher development model “ACCT teacher development model” (2nd draft) 138

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

LIST OF FIGURES

page
Figure 1 Conceptual Framework.....6

Figure 2 Factors influencing whether teachers identify themselves as ‘out-of-field’ ..14

Figure 3 The Seven Components of TPACK.....54

Figure 4 Conceptual Framework (Draft).....77

Figure 5 Conceptual Framework (Final).....81

Figure 6 shows ACCT teacher development model (1st draft).....129

Figure 7 shows ACCT teacher development model (1st draft).....136

Figure 8 shows ACCT teacher development model (2nd draft).....137

Figure 9 show TPACK & Productive Pedagogical Transformation Model (Final)..141

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

CHAPTER 1
INTRODUCTION

1.1 Problem Statement

The effectiveness of administrators is a key to drive organizations or schools. Superintendents, principals, and others with authority in school systems are instrumental in providing the vision, time, and resources to support continual professional learning, a positive school climate, and success for all students. Administrators are in charge and responsible for planning resources such as man, money, materials and methods to bring out an effective organization or school. One of the important resources in all organizations is man or employees; in school context, it is teachers. School administrators have to support and enhance teachers' knowledge, capability, skills etc., so they can bring success for all students.

In this case, we will focus on an area of out-of-field teacher development. According to Hobbs (2012), school administrators need to consider the school context, school support and development plans, out-of-field teachers' prior and related knowledge in developing a professional development programme for them. She further explains that there is still a lack of understanding of the significance of out-of-field teaching experiences and it is an international concern to perceive that it is acceptable to put out-of-field teachers to positions out of their field. From the statements, we can see that there are special characteristics of out-of-field teachers and it is the reason why we need to pay attention to this.

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As Hobbs (2012) mentioned about out-of-field teachers' prior and related knowledge in developing a professional development programme, it urges us to consider teacher's knowledge, especially at the time when technology is needed to be integrated into teaching, for instance, during the Covid-19 pandemic. TPACK plays an important part as a theoretical framework for integrating technology and teaching for out-of-field teachers. Research has shown that high degree of technological competence in teachers does not mean that they can integrate it into teaching; therefore, we need to pay attention to how the world shapes the way we develop our teachers (Jaipal; & Figg, 2010: Mishra, Koehler, & Kereluik, 2009).

Specifically, in Thailand where we have many "out-of-field" teachers, we need to make sure that they feel confident in teaching and support them on their teaching practice. According to Prahakul and Traiwichikhun (2016), it is found that 59.4 % of Thai teachers who are working under the Office of Primary Education Service Areas have been assigned to teach out-of-field and there is a significant impact on student's

academic achievement comparing to in-field teachers. While a lack of qualified teachers causes schools to put teachers out-of-field, private schools in Thailand can hire people who do not have a degree in education to teach in schools through a temporary teaching permit (Kurusapha, 2014). This means all private schools in Thailand can hire people who do not have an educational degree to work as teachers. As mentioned earlier, there is a significant difference between in-field and out-of-field teacher quality; it is urging us to look into ways to develop teachers who are out-of-field, especially those who are working in private schools. Some out-of-field teachers are assigned to positions for which they are not suitably qualified. One way to support them is through professional development. Teachers who go through a professional development programme will be equipped with capability to teach and ways to raise students' achievement.

However, there are many factors that contribute to a student's achievement, including individual characteristics, family, and community, to name a few. Research suggests that, among school-related factors, teachers matter most. When it comes to student performance, teachers are estimated to have two to three times in comparison with the impact of any other school factors, including services, facilities, and even leadership. (McCaffrey, Lockwood, Koretz, & Hamilton, 2003; Rowan, Correnti & Miller, 2002; Rivkin, Hanushek, & Kain, 2000). It is professional development goal to develop teachers to be able to raise student's achievement. In this research, we will apply productive pedagogies framework. It is a framework that will help teachers to reflect on their teaching in the classrooms and has been used in teacher education programme as a framework for quality teaching (Education Queensland, 2010b). Productive pedagogies help teachers as well as professional development designers to improve student's intellectual and social outcomes. From all of the above reasons, we can conclude that school administrators are key people to drive schools and are those who bring success for all stakeholders, including teachers, students, parents, and ultimately society.

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1.2 Research Questions

1.2.1 What are the conceptual frameworks of teacher development, the concepts of TPACK, and productive pedagogies?

1.2.2 What are the current and desirable states related to the development model of private school teachers?

1.2.3 What is the appropriate model for private school teacher based on the concepts of TPACK and productive pedagogies?

1.3 Research Objectives

1.3.1 To study conceptual frameworks of teacher development, TPACK, and productive pedagogies.

1.3.2 To study the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies.

1.3.3 To develop a private school teacher development model based on the concepts of TPACK and productive pedagogies.

1.4 Definitions of Terms

Teachers refers to teachers teaching primary and secondary levels in a private school under the Office of Private Education Commission.

Out-of-Field Teachers refers to private school out-of-field teachers teaching in primary and secondary schools who haven't received their bachelor's degree in education and teachers who have a bachelor's degree in education but have been or currently been assigned to teach out of their own field.

Continuing Professional Development Models refers to a model based on Kennedy's (2005) analytical framework, which suggests that professional learning opportunities can be located along a continuum where the underpinning purposes of particular models of CPD can be categorised as 'transmission', 'transitional' or 'transformative'. There are 3 main models and 9 sub-models namely;

1) Transmission Model refers to a teacher development model that naturally function through externally delivered, 'expert' tuition focusing on technical aspects of the job rather than issues relating to values, beliefs and attitudes. This type of CPD does not support professional autonomy; rather, it supports replication and, arguably, compliance.

1.1) The Training Model refers to the training of teachers that deliver by expert with the content determined by the deliverer and the participants placed in a passive role.

1.2) The Award Bearing Model refers to a programme of study validated by universities, institutions, companies, or external validation in which after the completion participants will received a certificate of accreditation as a reward.

1.3) The Deficit Model refers to the professional development that based on the evaluation from teacher's performance or called performance management and then the school will implement and intervene the change in teachers performance based on the evaluation.

1.4) The Cascade Model refers to a condition where teachers attending training event and then disseminating the information to colleagues.

1. 5) The Standard-based Model refers to teacher development programme that usually being offer by educational institution or teacher commission, where these charters set standards for teacher development.

2) Transitional Models relies on both experts and community as a knowledge platform. It contains reflection from the reflective dialogue where constant feedback is an ongoing process, while certain level of autonomy depends on the role of the participants in the community.

2.1) Coaching and mentoring Model refers to supportive programme in schools that may be one on one relationship or between two teachers, which is designed to support teacher development. It involves a skill based for coaching and element of counseling for mentoring and professional friendship for both.

2.2) Community of Practice Model refers to a mutually supportive form of coaching and mentoring and include more than two people with mutual engagement, understanding, and learning within a community created based on an agreement.

3) Transformative Model refers to a model that suggests strong links between theory and practice (Sprinthall et al., 1996), internalisation of concepts, reflection, construction of new knowledge and its application in different situations, and an awareness of the professional and political context. Transformative models of CPD have the capacity to support considerable professional autonomy at both individual and profession-wide levels.

3.1) Action Research Model refers to the study of a social situation, involving the teacher themselves as researchers, with a view of learning and improving the quality of teaching.

3.2) Transformative Model refers to the development of teachers to transform out of field teachers to an infield teachers capable of teaching proficiently in the midst of educational changes. In this development, it involves the combination of a number of processes and conditions – aspects of which are drawn from the evaluation of outputs (Technological pedagogical content knowledge and Productive pedagogies) then retrain the teachers by integrating other models described above.

Technological Pedagogical Content Knowledge refers to the complex interplay of three primary forms of knowledge, which serves as a guideline for the domain of knowledge in this research. The primary knowledge domain consists of:

1) Content Knowledge (CK) refers to teachers' knowledge about the subject matter to be learned or taught.

2)Pedagogy Knowledge (PK) refers to teachers' deep knowledge about the processes and practices or methods of teaching and learning.

3)Technology (**TK**) refers to knowledge about certain ways of thinking about, working with technology, tools, and resources.

4) Pedagogical Content Knowledge (**PCK**) refers to knowledge of pedagogy that is applicable to the teaching of specific content. It is the notion of the transformation of the subject matter for teaching.

5) Technological Content Knowledge (**TCK**) refers to an understanding of the manner in which technology and content influence and constrain one another.

6) Technological Pedagogical Knowledge (**TPK**) refers to an understanding of how teaching and learning can change when particular technologies are used in particular ways.

7) Technological Pedagogical Content Knowledge (**TPACK**) refers to a deeply skilled teaching with technology. It is the basis of effective teaching with technology, requiring an understanding of the presentation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help address some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones.

Productive Pedagogies refers to the twenty Productive Pedagogies under the four dimensions that are constructed in the Productive Pedagogies Classroom Reflection Manual, as a guide from Queensland Education, to provide an index of quality teaching and students' learning and to be used to help teachers to reflect on their classroom practices and generating professional development dialogue. Productive pedagogies dimensions, items and key questions addressed (The State of Queensland, Department of Education, 2002):

1) Intellectual quality: Higher order thinking, Deep knowledge, Deep understanding, Substantive conversation, Knowledge problematic, Metalanguage.

2) Relevance: Knowledge integration, Background knowledge, Connectedness to the world, Problem-based curriculum.

3) Supportive classroom environment: Student control, Social support, Engagement, Explicit criteria, Self-regulation.

4) Recognition of difference: Cultural knowledge, Inclusivity, Narrative, Group identity, Citizenship

1.5 Conceptual Framework

Private School Teacher Development Based on the Concepts of TPACK and Productive Pedagogies

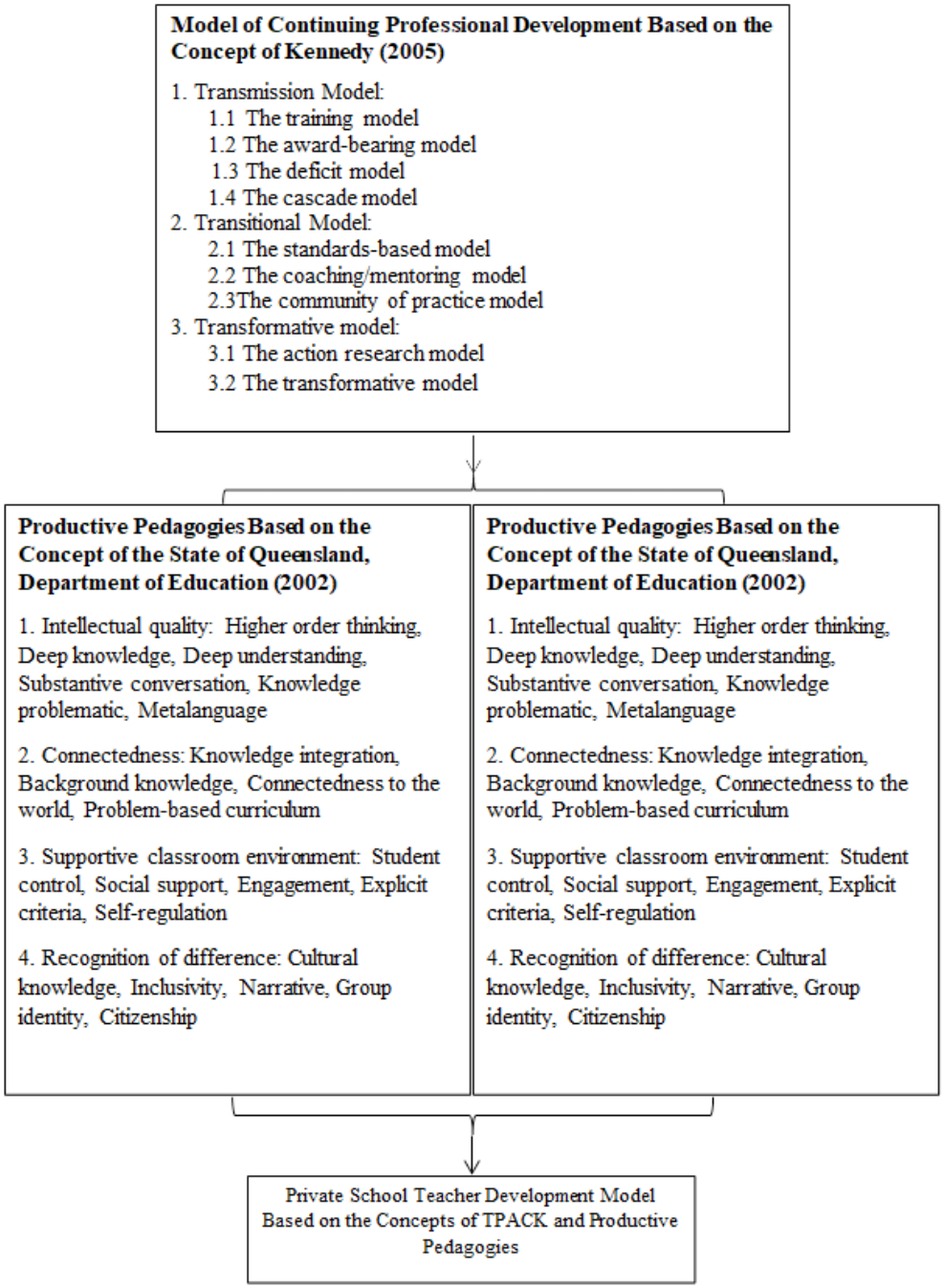

Figure 1 Conceptual Framework

1.6 Scope of the Study

The research on private school teacher development model based on the concepts of TPACK and productive pedagogies will study and explore the knowledge relating to out-of-field teachers, professional development, TPACK, and productive pedagogies. Lastly, this research will propose a model to better develop the current and future private school teachers who are teaching out-of-field throughout Thailand.

1) Scope of the Contents

1.1) The understanding of the factors influencing out-of-field teachers (Hobbs, 2012) will be studied and used as a reference to understand the nature of out-of-filed teachers in order to develop private school teacher development model. The factors influencing out-of-field teachers are:

1.1.1) Context: Geographical region, school size and design, school and state governance structures, practice and policy.

1.1.2) Support Mechanisms: 2.1 Provision; support materials, processes and people. 2.2 Self-sought; professional development, collegial sharing and discourse, external support. 2.3 Self-constructed; personal experiences and personal research.

1.1.3) Personal Resources: 3.1 Adaptive expertise; balancing innovation and efficiency. 3.2 Teacher knowledge; disciplinary background, what and how to teach learners, curriculum documents. 3.3 Dispositions; confidence with disciplinary ideas and modes of inquiry, commitment to the subject and students.

1.2) The concept of Continuing Professional Development Models refers to a model based on Kennedy's (2005) analytical framework, which suggests that professional learning opportunities can be located along a continuum where the underpinning purposes of particular models of CPD can be categorised as 'transmissive', 'transitional' or 'transformative'

1.3) The concept of technological pedagogical content knowledge refers to the complex interplay of three primary forms of knowledge which serves as a guideline for the domain of knowledge in this research. The primary knowledge domain consists of: Content (CK), Pedagogy (PK), and Technology (TK) and the kinds of knowledge that lie at the intersections between three primary forms: Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK).

1.4) The concept of productive pedagogies refers to the twenty Productive Pedagogies under the four dimensions that are constructed in the

Productive Pedagogies Classroom Reflection Manual, as a guide from Queensland Education, to provide an index of quality teaching and students' learning and to be used to help teachers to reflect on their classroom practices and generating professional development dialogue. Productive pedagogies dimensions, items and key questions addressed (The State of Queensland, Department of Education, 2002):

1. 4. 1) Intellectual quality: Higher order thinking, Deep knowledge, Deep understanding, Substantive conversation, Knowledge problematic, Metalanguage.

1.4.2) Relevance: Knowledge integration, Background knowledge, Connectedness to the world, Problem based curriculum.

1.4.3) Supportive classroom environment: Student control, Social support, Engagement, Explicit criteria, Self-regulation.

1.4.4) Recognition of difference: Cultural knowledge, Inclusivity, Narrative, Group identity, Citizenship

2) Scope of the Population and Research

This research applies a multiphase mixed-methods approach (Creswell & Plano Clark, 2007:85, Creswell & Plano Clark 2011:69), exploring qualitative data first and then quantitative data to develop a private school teacher development model. The population in this research is 3,776 schools under Office of Private Educational Commission (Ministry of Information and Communication Technology, 2013). The informants in this research are 351 administrators and 351 out-of-field teachers at the Office of Private Education Commission. The sample numbers are calculated using Krejcie and Morgan equation (Krejcie & Morgan, 1970). The research instruments are conceptual evaluation form, questionnaires on the present and desirable state of out-of-field teacher development, model evaluation form, and related documents concerning out-of-field teacher development model. For data analysis, descriptive statistics and PNI modified (mean and standard deviation for each item), and content analysis are used to analyse the interview data.

1.7 Significance of the Research

This research investigates the aspects concerning the shortage of teachers and ministry of education policy that gears towards solving this problem. It also aims to find the ineffectiveness of the teaching permit without license system and to overcome its ineffectiveness through the implementation of a training course. This will give insight in the process of teacher recruitment and licensing of the ministry of education. The priority-needs assessment analysis will give insight on the aspects of out-of-field teachers' needs towards effective instruction, while the training aims to benefit the performance of trained teachers and student academic achievement. As a

result, the researcher expects that out-of-field teachers can also effectively teach upon the completion of the training course.

1.8 Expected Outcome

1.8.1 The result of the research will reveal information regarding out-of-field teaching and challenges that out-of-field teacher face and a model that helps to support and better improve the quality of out-of-field teachers.

1.8.2 Private and public schools would have a model that helps to improve the instructional quality of out-of-field teachers in schools and better educate the students in order to achieve desirable outcomes.

1.8.3 Teachers and administrators may use the model as a guideline in their classroom practice to improve their quality of instruction and quality of learning.

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CHAPTER 2

LITERATURE REVIEW

The researcher has studied related researches and articles in order to achieve the research objectives, the contents are as follows:

2.1 Knowledge Related to Out-of-Field Teachers

2.1.1 Shortage of Teachers

2.1.2 Ministry of Education Action Plan for Specific Field Teacher Shortage

2.1.3 Out-of-Field Teachers

2.1.4 Data on Out-of-field Teachers

2.1.5 Importance of Teacher Training and Out-of-field Teaching and Professional Development

2.2 Knowledge Related to Teacher Development Models and Practices

2.2.1 Teacher Development Models and Practices

2.2.2 Evidence-Based Professional learning Practices

2.2.3 Evidence-Based Profession Development of out-of-field teaching

2.2.4 Professional Development Programme Success Factors

2.2.5 Teachers' Factors Related to Student Achievement

2.3 Models of Continuing Professional Development

2.3.1 The Training model

2.3.2 The Award-bearing Model

2.3.3 The Deficit Model

2.3.4 The Cascade Model

2.3.5 The Standard-based Model

2.3.6 The Coaching/Mentoring Model

2.3.7 The Community of Practice Model

2.3.8 The Action Research Model

2.3.9 The Transformative Model

2.4 Kennedy's framework for analysis of CPD models

2.5 Analysis of Characteristics of Models for Professional Development Based on Kennedy Framework (2005)

2.6 Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge

2.6.1 Effective Teacher Professional Development and Technology Integration

2.6.2 Components of TPACK Framework for Professional Development

2.7 Productive Pedagogies

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2.7.1 Productive Pedagogies Framework
2.7.2 Productive Pedagogies Dimensions
2.7.3 Summary of Productive Pedagogies Dimensions

2.1 Knowledge Related to Out-of-Field Teachers

2.1.1 Shortage of Teachers

There have been debates in Thailand over years on teacher shortage and the number of teachers in urban and rural areas. According to Ministry of Education (2015), the students and teacher ratio should be 30:1 in primary levels and 40:1 in secondary levels. If we look at the number of primary level students and secondary level students in both public and private institutions, we will get a total number of 11,190,164 students (Ministry of Information and Communication Technology, 2013). In comparison to the number of primary and secondary teachers, which are 535,622 teachers, we can tell that the number of current teachers actually exceeded the number of teachers required to meet with the students and teacher ratio (30:1) indicated by the Ministry of Education.

While there is an oversupply of teachers, a cross-national study found that Thailand has "established" systems of attracting the best into teaching and motivating teachers to perform, which implied that they had good practices with some limitations (World Bank, 2012). However, the shortage of qualified teachers remains a large problem in Thailand. The teacher shortage index is high (0.65) compared to the average OECD countries and the high-income East Asian economies (0.51 for Japan, -0.31 for Taiwan, China, and -0.2 for Hong Kong SAR, China). This shortage may hinder student academic achievement—a unit increase in the teacher shortage index is correlated with an 18.2 point decrease in Thai students' average science test scores (World Bank, 2012).

Moreover, the Ministry of Education (2013) has announced the number of teachers who will retire from year 2013-2017. There will be 97,254 teachers retiring in these four consecutive years, which is around 18 % of the total teacher workforce and this may cause the shortage of teachers. Mathematics seems to be the subject with the highest teacher shortage, followed by English and Thai, according to Varakorn Samakoses (2013), a former deputy education minister.

2.1.2 Ministry of Education Action Plan for Specific Field Teacher Shortage

With the scarcity of teachers in specific fields such as English, maths, Thai Language, science etc., Thailand Ministry of Education (2014) announced an action plan regarding the development of teachers with the emphasis on the subject areas that faced teacher shortage. Thailand Ministry of Education allowed people who have knowledge in the subject areas that faced shortage of teachers to teach in schools with a temporary teaching permit without a license. According to Teachers and Educational Personnel Council Act (2003) this certificate is not a teaching license. This certificate authorizes an individual to serve as a teacher in the school he/she is offered the job. The director of the school must state the intention to employ an individual to fill a teaching vacancy when a licensed teacher cannot be employed. The certificate is valid for two years and can be renewed twice thereafter. Therefore, the certificate can be used for a maximum of six years (Kurusapha, 2014). During these six years, the individual must demonstrate the documentary evidence relating to self-development to gain the professional knowledge required to get the teaching license, i.e. the evidence of passing the professional knowledge certification through testing or studying for a degree in educational field (Kurusapha, 2014).

As we can see, Thailand Ministry of Education and Kurusapha are trying to solve the problem of the scarcity of teachers. However, teaching is not considered as an attractive occupation in Thailand with regard to the pay. Although there have been efforts to increase teacher salary, which has been low when compared with other professions – about 25% of physicians' and engineers' salaries (Ingersoll, 2007). It is common in Thailand for teachers to run extra part-time jobs. As a result, among many of those enrolled in teacher education institutions in Thailand, teaching was a second career choice (Ingersoll, 2007). On the other hand, Thailand Ministry of Education has announced an increase in the salary for teachers (OPEC, 2014), however, no solid evidence has been proved on the effectiveness of this implementation yet.

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Despite the government's campaign to overcome the scarcity of teachers and the increase in teacher salary, schools may still need to accept teachers who are out-of-field due to a lack of qualified teachers. Several research studies suggest that one common prominent problem among all studies was the problem with the teacher's qualifications (Vigilante, 2007; Ngamsom, 2007; Nonthapak, 2004; Noisakul, 2006; Phonlabutra, 2008; Jansong, 2004; Bax, 2009; Decha, 2006). Many Thai and foreign teachers did not have a degree in the required field; some didn't achieve satisfied academic achievement.

2.1.3 Out-of-Field Teachers

Another concern of Thai education is the adoption of out-of-field teaching. This refers to the extent that teachers teach a subject in which they are not qualified. Noted that out-of-field teaching results not only from teacher shortage, but also from the way schools manage human resources. The data on out-of-field teaching show major teacher shortage in key subjects (Ket-sing, 2006; Siribanpitak, 2005; Siribanpitak and Boonyananta, 2007). More teachers are needed in all core subjects, especially foreign languages, mathematics and science, according to OEC research (OEC, 2007). The shortage was calculated based on the number of subject instruction hours and the number of teachers teaching the subject in each school. The Thai curriculum has eight core subjects: Thai language; mathematics; science; social studies, religions and culture; health and physical education; art; occupational and technology-related education and foreign languages. Among them, foreign languages (primarily English), mathematics and science are regarded as critical and the shortage is more severe in these subjects.

In 2005, there was a shortage of roughly 10,000 teachers of foreign languages—8,000 teachers of mathematics and 8,000 teachers of science (OEC, 2007). Given that foreign languages, mathematics and science are key areas of shortage concern, there is an urgent need to understand teachers' position in this increasingly common practice in order to provide appropriate system responses. Teacher identity and self-efficacy influence the quality of mathematics and science education, but McConney & Price (2009) claim that these areas are thus far under-researched in relation to teachers teaching out-of-field. A theoretical framework is needed to capture the complexity of the experience of teaching out-of-field. Whilst the term 'out-of-field' has a technical meaning relating to education- and discipline-related qualifications (McConney & Price, 2009), in a more significant sense, there is a need to consider how teachers identify themselves and their practice as being out-of-field and factors that influence whether the technical definition aligns with their self-assessment.

Hobbs (2012) found three factors influencing whether teachers identify themselves as out-of-field.

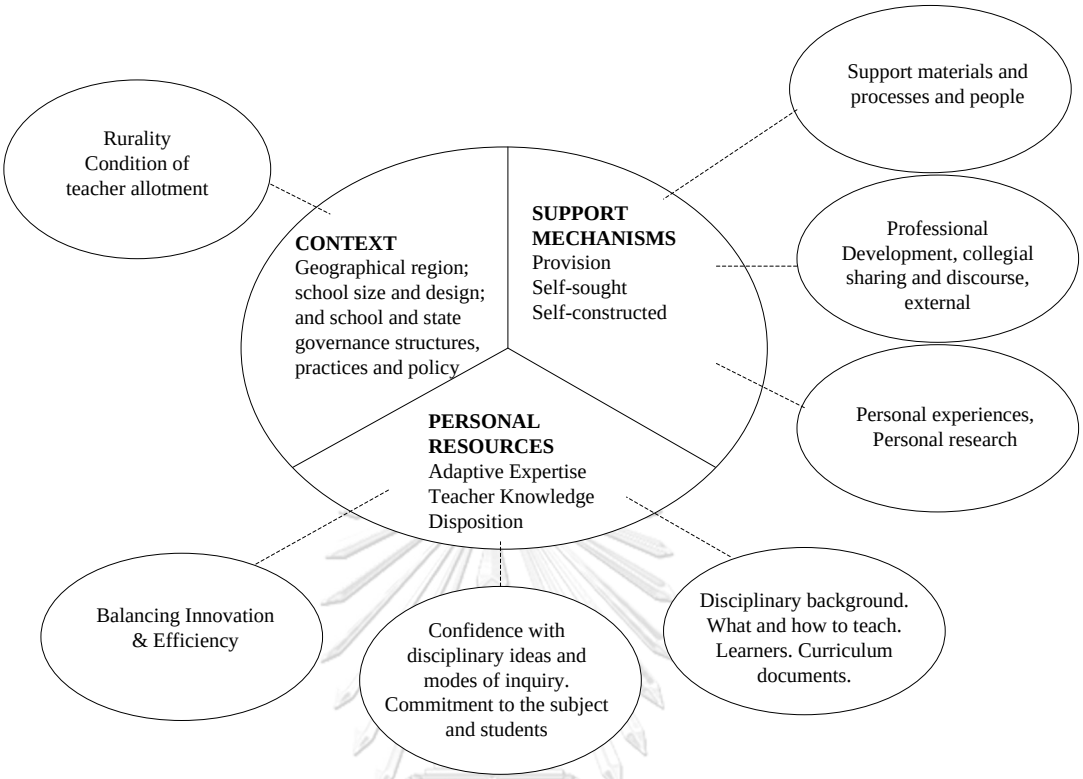

Figure 2 Factors influencing whether teachers identify themselves as 'out-of-field'

Contextual factors relate to the geographical region; school size and design; and school and state governance structures, practice and policy. This study showed that in rural and regional areas, rurality influenced the availability of resources, collegial support and professional learning opportunities. The rural context of these teachers created a range of limitations and possibilities for the out-of-field teachers. Whilst rural settings provide many benefits for schools (Tytler, Symington, Darby, Malcolm & Kirkwood, 2011), rurality limits the support mechanisms available because there are limited subject specialists to ask for advice and professional development is held at great distances from the school. Certainly, difficulties in the attraction and retention of qualified teachers in rural areas provide a constant pressure on schools.

Support Mechanisms are important for a safe boundary crossing, the degree to which a teacher felt supported influenced those teachers who wanted to improve in their practice. If teachers are to adapt to the new field or domain, conditions must be

conducive for them to make the necessary adjustments not only to their knowledge but also their perceptions of themselves as teachers of the subject. Support mechanisms are vital. The quotes mentioned here suggest that, rather than disjointed, one-off professional development events, a range of support mechanisms over a period of time that is negotiated or initiated by the teachers and offered at the teacher's point of need, and opportunities to teach a subject a number of times are more likely to lead to real professional learning and identity development. Support mechanisms can be referred to as 'boundary objects' that assist in moving between in-field and out-of-field spaces. Star (1989) describes boundary objects as 'bridges' or 'anchors' between 'intersecting social worlds'. In relation to his work on communities of practice, Wenger (1998:105) describes boundary objects as "forms of reification around which communities of practice can organize their interconnections".

Personal Resources can be examined in terms of what teachers bring to their out-of-field teaching as well as what they are missing. Highlighting what they have and have not can help target professional learning. This analysis identified teachers' adaptive expertise, knowledge, and confidence and commitment as dispositions as contributing to whether teachers felt in-field or out-of-field.

The model presented in this paper informs the development of theory relating to the contextual nature of teachers' work, teacher identity and school governance, but more importantly, the model brings into focus the roles that support, context and personal resources play in the success of teachers' subject boundary crossings. A response to the problem of teaching out-of-field that focuses on school environment rather than issues of supply and demand is supported by Ingersoll (2002). This investigation of the personal impact of teaching out-of-field highlights the need for closer examination of the availability, variety and opportunity for teacher support in rural and regional areas; collaborative approaches to and professional dialogue around teacher allocation; and a more complex definition of teaching out-of-field that recognizes teachers' personal resources, context and support. In relation to initial teacher education, the data point to the need for greater focus on teacher education concerning the skills, knowledge and attitudes needed to increase teachers' adaptability when faced with having to move outside their domain. Focusing on the development of resilience in pre-service teachers may help them as early career teachers to accommodate new and different ways of thinking; challenge their own beliefs, assumptions, values and practices when faced with the dilemmas and tensions of teaching; and help them employ proactive coping strategies (Johnson, Down, Le Cornu, Peters, Sullivan, Pearce et al., 2010), such as those support mechanisms highlighted by this process

2.1.4 Data on Out-of-field Teachers

Table 1 Statistics of Teachers with Teaching Licenses

No.	Occupation categories	Below Undergraduate	Educational Degree				Other Degrees			Degrees Unspecified	Total
			Bachelor	Teaching Diploma	Master	Ph.D.	Bachelor	Master	Ph.D.		
1	Teachers	13,763	496,786	67,206	63,550	286	84,140	6,107	184	37,123	769,145
2	School Directors	186	13,669	4,892	47,384	214	1,349	881	126	2,644	71,345
3	Educational Administrators	2	634	614	4,439	75	40	108	39	118	6,069
4	Educational Supervisors	8	578	55	6,490	52	76	205	22	132	7,618
Total		13,959	511,667	72,767	121,863	627	85,605	7,301	371	40,017	854,177

Source: (Kurusapha, 2014)

From the tables above, there is no doubt about the significance that out-of-field teachers play in the education market. Schools in rural areas and suburbs of Bangkok need teachers from other fields to replace the shortage of in-field teachers. From the table, we can see the current total number of teachers in Thailand. Here we categorize them into teachers with: below undergraduate degree (those who didn't graduate), teaching diploma (those who graduated in other fields and took teaching diploma to get teaching license), other degrees (those who graduated out-of-field and obtained temporary teaching license), and degree unspecified (those who did not specify their degrees) as out-of-field teachers because all the teachers in these four categories did not graduate in educational field. When we summed up the number of all the four categories of teachers mentioned above, the number of out-of-field teachers is 220,020, which is 25.75 % of the total population of teachers according to Kurushpa (2014). This number urges us to notice that the problems of out-of-field teachers should be taken seriously as several research papers researches show that the teachers' classroom practice affects student achievement (Wenglinsky, 2000,2002; Joyce, 2002).

2.1.5 Importance of Teacher Training and Out-of-field Teaching and Professional Development

Despite the importance of teacher training in most schools, there is surprisingly little evidence on the effect of teacher training on student achievement (Jacob & Lefgren, 2001). Based on an analysis of teacher training policies in 25 countries, the OECD (2005) report cogently entitled "Teachers Matter" comes to the conclusion that teachers' quality is the most important factor in an education system, and is the second most important factor (only preceded by "family background") among the variety of influences affecting student achievement. As some researchers

have found that teachers' quality is the most important factor in raising student achievement, professional development is an option that educators should give importance to so that they are able to improve their performance and raise student achievement. One way to develop teachers' quality of instruction and improve academic outcome is through teacher training. Training is one of the most pervasive methods for enhancing individual productivity and improving job performance in the work environment (Goldstein and Ford 2002; Gupta and Bostrom, 2006). This statement is supported by Alipour (2009)'s study which found that on-the-job training strongly affects and leads to more creativity, achieves organizational objectives and improves work quality.

Out-of-field Teaching and Professional Development

Martin Luther King (Jr) once said, "... the function of education is to teach one to think intensively and to think critically. Intelligence plus character – that is the goal of true education" (King, King, & Washington, 1986). Teachers are at the center of exceptional educational reform and the key to the prosperous development of nations (Garet, Porter, Desimone, Birman, & Hoon, 2001). Governments often turn their attention to education to manipulate power. These approaches are seen as "soft" power practices in order to achieve control (Sharma, 2012). The quality of education, however, is determined by the teachers in the classroom. Hattie (2009) claimed that teachers are the most valuable resources in schools. It seems, though, that educational leaders often overlook the fact that education takes place in the classroom and not around large meeting tables.

It is no doubt that teachers' placements steer educational quality. In addition, teachers' placements in positions outside their field of qualification have major implications for professional development programmes and the effective development of these teachers. Teaching out-of-field means that teachers teach subjects or year levels without having the appropriate qualifications, which causes them to have specific developmental needs. Moreover, educational leaders' misunderstandings of the meaning of out-of-field teaching and its impact on professional development not only influences the effectiveness of the teaching and learning environment but also influences these teachers' development opportunities.

Restricting professional development of teachers means restricting educational development. In this paper professional development is looked upon as the professional learning of out-of-field teachers, which involves informal and opportunistic developmental experiences these teachers can have in unfamiliar subjects. Professional learning includes corridor chats with experts or specialists, formal and informal mentoring from specialist teachers, and meetings. These professional learning incidents play a major role in the effective application of formal

professional development programmes. The more connected or related these efforts are the more benefit out-of-field teachers might receive.

The practice of out-of-field teaching has become an international concern which in countries such as Australia (Hobbs, 2012; McConney & Price, 2009), the USA (Ingersoll, 2002), the UK (Loveys, 2011), Europe (Bonesrønning, Falch, & Strøm, 2003; Maaranen, Kyna¨ slahti, & Krokfors, 2008) which includes countries such as Norway and Germany, Turkey (Kan, C¸inkir, Olgun, Eryilmaz, & Cemalog˘lu, 2013) and South Africa (Du Plessis, 2005, 2010). When teachers are assigned to positions for which they are not suitably qualified this often results in the lived experiences of not feeling ''at home'' or a struggle to experience ''belongingness'' in specific out-of-field subjects or year levels. These feelings of ''uneasiness'' about subjects or year levels influence the stability within a school's teaching and learning environment. Zepeda (2006) noted that half of beginning teachers do not receive the support they need from educational leaders. It is viewed that professional development which is disconnected from the ''life-world'' of out-of-field teachers is limited and has no benefits for these teachers' professional development. However, professional development that is targeted to their professional needs has the potential to positively change out-of-field teachers' career options. Borman and Dowling (2008) noted that teacher attrition decreases as teachers develop a sound and specific knowledge capital from which they can teach.

Hallinger and Heck (1996) claimed that school leaders outline teachers' professional development and initiate changes to improve teaching practices according to their perceptions and understandings. Assigning teachers to out-of-field positions without understanding their lived experiences has significant meaning for the support they receive from leaders as well as professional development opportunities that are available to them. Hobbs (2013) claimed that there is an urgent need to understand the complexities surrounding out-of-field teaching. Taking note of a workforce report in Australia (Skills Australia, 2010), that 39% of metropolitan principals and between 42 and 66% in remote areas admit that they experience recruitment and placement difficulties, 50% of principals admitted that they would assign teachers to positions without them having suitable qualifications for a specific position. Detailed statistics portray the seriousness of this concern for professional development programmes with Darby (2012) noting that on average 16% of the science teachers and 24% of the mathematics teachers in Australia lack suitable qualifications for the positions in which they teach. Additionally it is noted that 39% of all science teachers in South Africa are unsuitably qualified for their specific positions (Silva, 2010) while 26.6% of the maths teachers, 28.7% of the geography teachers and 31.4% of the physics teachers in the UK are not suitably qualified for the subject they teach (Loveys, 2011). The transnational tendency to assign teachers to positions for which

they are not qualified turns our focus to the specific professional development opportunities made available for these teachers. A literature exists about professional development and professional development programmes. The dilemma we faced was that there is no literature available that unpacks the lived meaning of out-of-field teaching for professional development or professional development programmes in relation to the specific needs of these teachers and the perceptions of their leaders. It is an area riddled with complexities but unresearched and overlooked up to now. Guskey (2000) claimed, however, that professional development is closely connected to teachers' experiences, practices and beliefs in relation to teaching and learning. Overlooking the specific developmental needs of teachers in out-of-field positions is detrimental for both the teachers and the professional development efforts.

A continuing movement between development, change and transformation is the nature of effective teaching and learning environments. Day (1999) claimed that continuing reflections about pedagogies and beliefs influence teachers' understanding of the need to improve and change. Professional development programmes should thus cater for the specific professional needs of teachers. Kagan (1992) suggested that professional development programmes have the potential to achieve a fine balance between developing professionalism, cultivating new knowledge and expertise. This paper aims to unveil the significant need to understand the meaning of out-of-field teaching for developing the balance between being professional, acquiring content knowledge, and developing expertise.

It is a misunderstanding to assume that teacher expertise in one field would automatically translate into expertise in other fields (Timperley et al., 2007). Shriki and Lavy (2012) shared concerns about how ineffectively the needs of teachers are currently incorporated into professional development programmes. Teachers' perception of their own skills and value influences their commitment to a subject, field or context that they experience as challenging and confronting (Labone, Butcher, & Bailey, 2005). Out-of-field teachers face unfamiliar content which leaves them feeling out-of-place and vulnerable. Givvin and Santagata (2011) suggested that the development of professional development programmes should focus on an aim to connect with the teachers and not the opposite way around. Loucks-Horsley, Love, Stiles, Mundry, and Hewson (2003: 47) highlighted the importance of professional development programmes to "start where teachers are and build from there".

Professional learning and support programmes are more effective when taking the existing practices of teachers into account while developing content and methods that are familiar, understandable and applicable to teachers (Dyer et al., 2004). Out-of-field teachers have to adapt to new structures, contents and approaches which often form part of new curricula without suitable knowledge for a specific area or subject. Development programmes that stimulate and support teachers to analyse

and reflect on the reasoning behind what they do in their classrooms are beneficial (Shriki & Lavy, 2012). Wilson and Berne (1999) claimed that professional development programmes are beneficial when focusing on teachers' experiences during the development of these programmes.

The essence of developing a support programme for out-of-field teachers is rooted in how well school leaders and the developers understand the lived experiences of these teachers. Smith (2011) highlighted the influence played by a combination of external aspects, leaders, environment, time and the role of colleagues in the development of teachers. School leaders who are closely connected to their out-of-field teachers, and who understand their lived experiences would have the insight to choose appropriate development opportunities while keeping passion and interest in mind.

The Organisation for Economic Cooperation and Development (OECD, 2013) suggests that qualifications reflect several different skills such as information-processing and job-specific competencies while it suggests that the skills used also depend on the effort that workers invest in their jobs. We acknowledge that although teachers in out-of-field positions are not suitably qualified for a subject or year level, they might have specific skills which will support them to have success in these positions with the help of appropriate development programmes. Garet et al. (2001) and Ingvarson (2002) noted that enhancing the content knowledge of teachers transforms their confidence, classroom approaches, and their guidance of students' learning. In agreement with Shriki (2011), the attention needs to be paid to the very specific needs of out-of-field teachers in order to activate and unlock the full potential of professional development programmes, with a focus on teachers assigned to positions for which they are not suitably qualified. The intent is to investigate concerns about the effective professional learning and professional development of teachers in out-of-field positions.

The table below shows factors related to Out-of-Field teacher development. There are several factors that contribute to the development of Out-of-Field English teachers, the most common factor mentioned in the literature are the support mechanisms that helps to improve teaching quality.

Table 2 Factors Related to Out-of-Field Teacher Development

Factors \ Researchers	McConney & Price (2009)	Hobbs (2012)	Tytler, Symington, Darby, Malcolm & Kirkwood, (2011)	Star (1989)	Wenger, (1998)	Ingersoll (2002)	Johnson, Down, Le Cornu, Peters, Sullivan, Pearce et al., (2010)	Zepeda (2006)	Borman and Dowling (2008)	Guskey (2000)	Timperley et al., (2007)	Labone, Butcher, & Bailey(2005)	Givvin and Santagata (2011)	Smith (2011)
Teacher Identity and Self-Efficacy	✓	✓							✓	✓	✓	✓	✓	
Context		✓	✓					✓					✓	
Personal Resources: Adaptive expertise; balancing innovation and efficiency. Teacher knowledge; Disciplinary background, what and how to teach learners, Curriculum documents. Dispositions; confidence with disciplinary ideas and modes of inquiry, commitment to the subject and students.		✓							✓	✓	✓		✓	
Support Mechanisms: Provision; support materials, processes and people. Self-sought; professional development, collegial sharing and discourse, external support. Self-constructed; personal experiences and personal research.		✓		✓	✓	✓	✓	✓	✓					✓

2.2 Knowledge Related to Teacher Development Models and Practices

2.2.1 Teacher Development Models and Practices

Teaching quality has been defined as "instruction that enables a wide range of students to learn" (Darling-Hammond, 2012), and it is the strongest school-related factor that can improve student learning and achievement (Hanushek, 2011; Nye, Konstantopoulos, and Hedges, 2004; Rivkin, Hanushek, and Kain, 2005). Accordingly, it is intriguing to explore the best way to foster and provide ongoing support for good teaching practices? While every school is unique, research has identified several elements that can almost universally increase the chances for successful teacher development and create a powerful and positive school community.

The following six steps process provides some details about the range of best practices found by researchers to be critical for ensuring educator growth and success:

1) Effective Administrator and Student Achievement
2) Teacher Leadership and Student Achievement
3) Job-Embedded Professional Development
4) Professional Learning Communities
5) Professional Development Programme Success Factors
6) Teacher's Factors Related to Student Achievement

Effective Administrators and Student Achievement

Leadership is second only to teaching among school-related factors that can improve student achievement, and it tends to show greatest impact in traditionally underserved schools (Leithwood, Seashore Louis, Anderson, & Wahlstrom, 2004). Superintendents, principals, and others in positions of authority in school systems are instrumental in providing the vision, time, and resources to support continual professional learning, a positive school climate, and success for all students (Leithwood et al., 2004; The Wallace Foundation, 2012). Research shows that the following features of effective leadership can improve student achievement (Leithwood et al., 2004; Vescio, Ross, and Adams, 2008; The Wallace Foundation, 2012):

1) A vision of academic success for all students based on high expectations
2) A safe and cooperative climate for learning
3) Support and training to promote continual professional learning
4) Data to track and promote collaborative inquiry and practices that improve student learning
5) Cultivating leadership in staff, parents, and community partners

Great leaders focus on developing people's capacities rather than their limitations (Leithwood et al., 2004; Alliance for Excellent Education, 2011). Schools

that foster trust among parents, teachers, and school leaders are more likely to see academic improvement than schools that do little or fail to foster trust (Bryk and Schneider, 2003).

Teacher Leadership and Student Achievement

Teacher leadership is also critical for school improvement efforts to succeed. Accomplished teachers are most knowledgeable about how students in their school or district learn, and thus they are ideal candidates to lead professional-learning and curriculum development efforts (Vescio et al., 2008; Webster-Wright, 2009; Accomplished California Teachers, 2012). Teacher-advancement systems that effectively identify and support quality teaching include the following features (Accomplished California Teachers, 2012; Darling-Hammond, 2012):

1) Professional standards, such as those of the National Board for Professional Teaching Standards (NBPTS). Research has found that the National Board certification is a way to identify teachers who are more effective in increasing student engagement, learning, and achievement, and a variety of evidence shows that NBPTS-certified teachers may be more likely to stay in the profession, as compared to teachers who have not achieved certification (NBPTS, 2012; NBPTS Research page). Additionally, the standards themselves influence teacher mentoring, leadership, team building, professional development and evaluation, curriculum development, efficacy, and overall school leadership (NBPTS: Impact of National Board Certification page; NBPTS Research page).

2) Performance assessments that integrate evidence of teaching practices and student learning measured in a variety of ways (such as student work, lesson plans, assignments, in-person or video observations based on standards, and/or National Board assessment).

3) Consideration of practice and performance for teacher teams and individual teachers to encourage collaboration and knowledge sharing.

4) Expert evaluations, with experts who include teachers who are trained in evaluation criteria and have demonstrated expertise in teaching the content and working with their peers.

5) Useful feedback connected to professional-learning opportunities and reviewed by an oversight committee to ensure fairness and consistency.

6) Extensive evidence of quality teaching for tenure (e.g., using Peer Assistance and Review programmes as described in Darling-Hammond, 2012)

To promote student learning and achievement, research indicates that teacher advancement systems should compensate teachers for their expert contributions, particularly in economically disadvantaged schools where teaching challenges tend to be greater (Accomplished California Teachers, 2012).

Job-Embedded Professional Development

When teachers receive well-designed professional development, an average of 49 hours spread over six to 12 months, they can increase student achievement by as much as 21 percentile points (Yoon, Duncan, Lee, Scarloss, and Shapley, 2007). On the other hand, one-shot, "drive-by," or fragmented, "spray-and-pray" workshops lasting 14 hours or less show no statistically significant effect on student learning (Darling-Hammond, Wei, Andree, Richardson, and Orphanos, 2009). Above all, it is most important to remember that effective professional-development programmes are job-embedded and provide teachers with five critical elements (Darling-Hammond et al., 2009):

1) Collaborative learning: Teachers have opportunities to learn in a supportive community that organizes curriculum across grade levels and subjects.

2) Links between curriculum, assessment, and professional-learning decisions in the context of teaching specific content: Particularly for maths and science professional-development programmes, research has emphasized the importance of developing maths and science content knowledge, as well as pedagogical techniques for the content area (Blank, de las Alas, and Smith, 2008; Blank and de las Alas, 2009; Heller, Daehler, Wong, Shinohara, and Miratrix, 2012).

3) Active learning: Teachers apply new knowledge and receive feedback, with ongoing data to reflect how teaching practices influence student learning over time.

4) Deeper knowledge of content and how to teach it: Training teachers solely in new techniques and behaviors will not work.

5) Sustained learning, over multiple days and weeks: Professional-development efforts that engage teachers in 30 to 100 hours of learning over six months to one year have been shown to increase student achievement.

Research on professional development for teachers has shifted in the last decade from delivering and evaluating professional-development programmes to focusing more on authentic teacher learning and the conditions that support it (Webster-Wright, 2009). In the next section, we discuss models of professional learning that focus on supporting continual professional learning and community-based feedback cycles that help teachers to critically and collaboratively examine and refine their practices.

Professional Learning Communities

Professional learning communities (PLCs) or networks (PLNs) are groups of teachers that share and critically interrogate their practices in an ongoing, reflective, collaborative, inclusive, learning-oriented, and growth-promoting way to mutually enhance teacher and student learning (Stoll, Bolam, McMahon, Wallace, and Thomas, 2006). PLCs go a step beyond professional development by providing teachers with not just skills and knowledge to improve their teaching practices but

also an ongoing community that values each teacher's experiences in their own classrooms and uses those experiences to guide teaching practices and improve student learning (Vescio et al., 2008). Research shows that when professional learning communities demonstrate four key characteristics, they can improve teaching practice and student achievement in reading, writing, maths, science, and social studies subject tests (Vescio et al., 2008). These four key characteristics are:

1) Successful Collaboration

2) Focus on Student Learning

3) Continuous Teacher Learning

4) Teacher authority to make decisions regarding curriculum, the processes of their own learning, and aspects of school governance.

In the following sections, we discuss several practices of professional learning communities that have received consistent support such as:

1) Video-based reflections

2) Lesson study

3) Mentoring programmes

4) Grade-level teams

Video-based reflections: Using video to reflect upon teaching practice has been shown by several studies to improve teaching practice or student achievement (Allen, Pianta, Gregory, Mikami, and Lun, 2011; Brantlinger, Sherin, and Linsenmeier, 2011; Roth, Garnier, Chen, Lemmens, Schwille, and Wickler, 2011). In one case study, teachers met regularly to develop video clips of their best teaching practices for the National Board Certification application (Brantlinger et al., 2011). This resulted in the teachers engaging in intensive discussions about mathematical discourse while collaboratively and substantively examining each other's practices (Brantlinger et al., 2011). Similarly, in a case study of four middle school maths teachers who participated in a yearlong series of ten video club meetings to reflect on their classrooms, teachers in the video club "came to use video not as a resource for evaluating each other's practices, but rather as a resource for trying to better understand the process of teaching and learning" in a supportive, nonthreatening setting (Sherin and Han, 2004). MyTeachingPartner-Secondary (MTP-S) is a coaching system that provides a library of videos showing effective teaching, as well as personalized Web-based feedback videos of teaching practice using the research-based CLASS-S scoring system to define effective student-teacher interactions (Allen et al., 2011). In a randomized controlled experiment of 78 secondary school teachers and 2,237 students, MTP-S improved teacher-student interactions and increased students' performance on standardized tests by nine percentile points (Allen et al., 2011). Science Teachers Learning through Lesson Analysis (STeLLA) is a professional-development programme for upper-elementary school science teachers in which teachers develop two lenses for analyzing teaching, the "Student Thinking Lens" and the "Science Content Storyline Lens," to analyze videos of teaching practice. In an experiment with 48 teachers and 1,490 upper-elementary students, STeLLA

improved science teaching and science content knowledge among students and teachers (Roth et al., 2011).

Lesson study: Lesson study is a form of Japanese professional development that engages teachers in collaborative analysis of lessons. It has grown rapidly in the United States since being introduced in 1999 (Lewis, Perry, and Murata, 2006). One purpose of lesson study is to continually improve the experiences that teachers provide for their students. Teachers come together to work on three main activities: (1) identifying a lesson study goal, (2) conducting a small number of study lessons that explore this goal, and (3) reflecting about the process (including producing written reports). In one California school district, lesson study began when an instructional improvement coordinator and a maths coach sent an open letter inviting teachers to participate in lesson study during the 2000-2001 school years. In the first year, 26 teachers responded, and six years later, the school was still continuing the programme. Student achievement data at Highlands Elementary School suggest that lesson study is paying off for students (Lewis, Perry, Hurd, and O'Connell, 2006). Lesson study is used in the majority of elementary schools and middle schools in Japan but is rare in high schools (Yoshida, 2002).

Mentoring programmes: A body of research indicates that mentoring programmes can increase teacher retention, satisfaction, and student achievement (Ingersoll and Strong, 2011), as well as reduce feelings of isolation, particularly for early-career teachers (Beltman, Mansfield, and Price, 2011). For example, a quasi-experimental study by the Educational Testing Service found that teachers with a high level of engagement in a large-scale mentoring programme (California Formative Assessment and Support System for Teachers) improved both teaching practices and student achievement, producing an effect size equivalent to half a year's growth (Thompson, Goe, Paek, and Ponte, 2004). Mentor relationships are most successful when the mentor is positive, pro-social, professional, and from the same teaching area (Beltman et al., 2011).

Grade-level teams: Grade-level teams focused on student learning have also been supported by research. In a quasi-experimental study in nine schools, principals and teacher leaders used explicit protocols for leading grade-level learning teams, resulting in students outperforming their peers in six matched schools on standardized achievement tests (Gallimore, Ermeling, Saunders, and Goldenberg, 2009). These outcomes were more likely for teams led by a trained peer-facilitator, teaching similar content, in stable settings in which to engage in ongoing improvement, and using an inquiry-focused protocol (such as identifying student needs, formulating instructional plans, and using evidence to refine instruction) (Gallimore et al., 2009).

2.2.2 Evidence-Based Professional learning Practices

The following programmes have received support by independent evaluators or peer-reviewed publications, using independent outcome measures, and have developed to scale nationally. As professional-development research is in an early developmental stage (Borko, 2004), not many programmes have strong empirical support. Here is a summary of evidence-based profession learning practices and programmes:

Table 3 Summary of evidence-based professional learning practices and programmes

Evidence-Based Professional-Learning Practices & Programmes		
Programme	**Practice**	**Outcome & Evidence**
eMINTS (*Enhancing Missouri's Instructional Networked Teaching Strategies*) (K-12)	-Supports teachers in using technology to promote inquiry-based learning and information literacy. -Team building and coaching -Lesson study and Behavior management strategies.	-In a randomized controlled trial, eMINTS professional development and technology use increased students' performance on state tests in grades 3-6, as compared to students not in eMINTS classrooms (Meyers and Brandt, 2010).
Lesson study (K-8)	- Teachers identify a single lesson study goal, conduct a small number of study lessons that explore the goal, and reflect about the process. - To start a lesson study, see these resources by lesson study researchers Makoto Yoshida and Catherine Lewis.	- Teachers engaged in lesson study showed increased knowledge of subject matter and instruction, and achievement test scores did not refute possible positive impacts on student learning, based on a five-year case study of a California school district (Lewis, Perry, Hurd, and O'Connell, 2006).
MyTeachingPartner-Secondary (9-12)	- Video-based observation and feedback cycle. - Individualized coaching. - Web-based library of highly focused video clips	- In a study of 78 secondary school teachers and 2,237 students, MTP-S improved teacher-student

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Evidence-Based Professional-Learning Practices & Programmes		
Programme	**Practice**	**Outcome & Evidence**
	showing effective teachers in action.	interactions and increased students' performance on standardized tests by nine percentile points (Allen, Pianta, Gregory, Mikami, and Lund, 2011).
Video clubs (4-12)	- Video-based feedback and analysis of teaching practices for teachers. - Personalized support from trained consultants and/or colleagues. - Discussions focused on student-teacher interactions and student learning.	- Secondary maths teachers met 16 times to develop video clips for certification submissions to the National Board for Professional Teaching Standards, creating a professional learning community that improved their teaching practice (Brantlinger, Sherin, and Linsenmeier, 2011). Middle school maths teachers participating in ten 40-minute video club meetings improved their analysis of student thinking (Sherin and Han, 2004).
Success for All (K-12)	- Whole-school reform programme with intensive initial training and ongoing coaching and progress monitoring. - Cooperative learning. - Common Core alignment.	- A best-evidence synthesis of whole-school reform efforts found that Success for All improved maths skills among elementary and high school students and improved reading skills among K-5 students (Slavin, Lake, Chambers, Cheung, and Davis, 2010).
National Writing Project (K-16)	- Developing leadership of local teachers (teacher-consultants) who	- Students of teachers who participated in the National Writing Project

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Evidence-Based Professional-Learning Practices & Programmes		
Programme	**Practice**	**Outcome & Evidence**
	participate in summer institutes in teaching writing. - Customized in-service programmes. - Continuing education and research opportunities.	showed improved development of ideas, organization, and stance, as compared to control classrooms, based on 16 studies conducted in seven states (National Writing Project Research Brief, 2010).
National Board certification	- The National Board for Professional Teaching Standards certification assessment process includes components such as video, examples of student work, and content knowledge exercises. - Many districts and states provide aid and/or incentives for National Board certification.	- Research finds that the National Board certification identifies teachers who are more effective in increasing engagement, learning, and achievement and who are more likely to stay in the profession, as compared to teachers who have not achieved certification. The NBPTS supports new and struggling teachers and helps teachers assume school-based leadership roles (NBPTS Research page, 2012).
Mentorship programmes	- Effective mentorship programmes connect new teachers with positive, pro-social, professional mentors in the same teaching area.	- Mentorship programmes can increase teacher retention, student achievement (Ingersoll and Strong, 2011), problem-solving skills, and confidence and reduce feelings of isolation, particularly for early-career teachers (Beltman, Mansfield, and Price, 2011). - High engagement in the California Formative Assessment and Support

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Evidence-Based Professional-Learning Practices & Programmes		
Programme	**Practice**	**Outcome & Evidence**
		System for Teachers improved teaching practices and student achievement, producing an effect size equivalent to half a year's growth (Thompson, Goe, Paek, and Ponte, 2004).

Source: Vega (2013): Research Review: *Evidence Based Practices and Programmes*

Table 4 below will give a clearer picture of factors that involve in the development of teachers. For teacher development, it is seen that effective administrators and support, communities of collaborative learning and ongoing professional development are the three most important factors. Other factors include teacher leadership, trust, career advancement and clear structure time and purpose of development plans.

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Table 4 *Factors Related to Teacher Development Model*

Researchers / Factors	Effective Administrators and Support	Trust	Advancement System	Teacher Leadership	Ongoing support (Job-Embedded Professional Development): collaborative learning, link between curriculum and assessment, active learning, deeper knowledge of content and how to teach, and sustain learning	Collaboration (PLC): share and critically interrogate their practices in an ongoing, reflective, collaborative, inclusive, learning-oriented, and growth-promoting	Clear Structure Time and Purpose
Leitwood et al.,(2004)	✓	✓					
Anderson, and Wahlstrom, (2004)	✓						
Jaquith, Mindich, Wei, and Darling-Hammond, (2010)	✓						
Bryk and Schneider, (2003)		✓				✓	
Hanushek and Rivkin, (2012)	✓	✓		✓		✓	
Beltman, Mansfield, and Price, (2011)	✓	✓		✓			
Vescio, Ross, and Adams, (2008)	✓			✓			
The Wallace Foundation, (2012)	✓						
Darling-Hammond, (2012)			✓	✓			
Webster-Wright, (2009)	✓			✓	✓		
Accomplished California Teachers, (2012)			✓	✓			
Yoon, Duncan, Lee, Scarloss, and Shapley, (2007)					✓		
Darling-Hammond et al., (2009)					✓		
Blank and de las Alas, (2009)					✓		
Daehler, Wong, Shinohara, and Miratrix, (2012)					✓		
Stoll, Bolam, McMahon, Wallace, and Thomas, (2006)						✓	
Allen, Pianta, Gregory, Mikami, and Lun, (2011)						✓	
Brantlinger, Sherin, and Linsenmeier, (2011)						✓	
Roth, Garnier, Chen, Lemmens, Schwille, and Wickler, (2011)						✓	
Lewis, Perry, Hurd, and O'Connell, (2006)						✓	
Ingersoll and Strong, (2011)					✓	✓	
Guskey and Yoon, (2009)					✓		✓
Garet et al., (2001)							✓

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2.2.3 Evidence-Based Professional Development of out-of-field teaching

Important recommendations were made about the professional development of teachers (Hobbs, 2013) and the aesthetic element and the need to identify discontinuity (Hobbs, 2012) which focuses on the lack of content knowledge, working with children at a specific level (e.g., behaviour management) and the implications of professional development. The argument addressed a complex but overlooked area of professional development that urgently needs further research.

According to research conducted by Vale (2010), in his research in Australia suggested that there is a low supply of maths teacher and there is a continue falling number of mathematics students. Therefore, schools need to rely on out-of-field teachers and in response to out-of-field teacher; Vitoria University has designed and deliver professional learning to out-of-field teachers. The programme was focusing on teacher's pedagogical content knowledge (PCK) and mathematical knowledge for teaching (MKT). The result shown a success in affirming teacher's identity as teacher of secondary mathematics, building confidence, knowledge and practice and relationships with colleagues, and enabling them to plan a career in mathematic teaching. The critical success was due to the design of the programme that promote pedagogical content knowledge, mathematical knowledge for teaching , and an ongoing mentoring relationship that enhance out-of-field teacher's practice-based experience.

Another studied by Dee (2008), this study examines whether subject-specific teacher certification and academic degrees are related to teacher quality. The analysis of these data indicates that assignment to a subject-certified teacher is associated with higher test scores. However, these gains appear to be concentrated in social studies and mathematics. Furthermore, the authors also find that subject-certified teachers are not more effective at promoting the intellectual engagement of their students but are more likely to have negative opinions of a given student's performance. However, their results also suggest that the educational returns to a subject qualified teacher in areas other than mathematics and social studies are smaller and statistically indistinguishable from zero. These findings could reflect the possibility that subject proficiency in these areas is less relevant at the middle school level. Alternatively, it could be that subject proficiency does matter in these subjects but that certification and academic majors, as currently regulated, fail to ensure that proficiency. This could occur, for example, if a middle school science teacher had a college degree in only one part of the science curriculum. Regardless, these results raise some doubt about how policy makers have chosen to identify high quality teachers as well as about the academic consequences of out-of- field teaching at the middle school level.

This reality urges us to ask questions about the practice of leaders to assign teachers to out-of-field positions without providing targeted and individualised professional

development programmes. The careful application of well and expensively trained teachers is calling for attention.

Being part of the ‘‘out-of-field world’’ poses a major challenge to these teachers. Vygotsky’s (1978) theory about the zone of proximal development entails that teachers not only know where their students come from, and where students are heading with their learning, but teachers are also able to thoroughly connect new skills and concepts to the student’s individual learning journey. This reality underlines the essence and the urgent need to support and provide professional development opportunities to equip out-of-field teachers to fulfill the role as the knowledgeable other, in spite of out-of-field positions. The intensity of this challenge is closely related to their leaders’ decisions about professional development and support strategies.

Educational leaders as well as school leaders need to be closely connected to and aware of the lived experience of these teachers, know their needs, negotiate what can be done to better their experiences in order to take appropriate action and provide effective professional development. Appropriate professional development efforts counteract unsatisfactory teaching experiences such as stressing through each day, trying to survive out-of-field teaching positions. Professional development prospects that focus on the specific needs of out-of-field teachers as a priority will encourage them, make them valued and cared for and might influence them not to contemplate leaving the teaching profession as the only solution available to them. Different forms of suitable and timely professional development make a difference to out-of-field teachers’ lived experience

2.2.4 Professional Development Programme Success Factors

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Every teacher can probably describe a boring or downright ineffective professional-development (PD) experience they’ve had. There are many challenges when trying to design a successful and engaging PD programmes for ongoing teacher education. We need to keep the following points in mind when deciding PD programmes.

Structure Professional Development Time with Purpose

Simply increasing time for professional learning will not in and of itself improve teacher practice. Effective professional learning time must be purposefully structured (Guskey and Yoon, 2009, citing Birman et al., 2000; Garet et al., 2001; Guskey, 1999).

Customize Professional Development Practices

No single professional-development practice, strategy, approach, method, or activity works well under all conditions. Professional development must be focused on both learning and learners and it should actively involve all stakeholders in

collectively constructing and re-constructing a shared vision of effective teaching for the local school context. As conditions change, improvement efforts at all levels should be poised to adapt. Borko (2004) has found that successful PD programmes work because dedicated facilitators are available to troubleshoot, customize, and adapt PD endeavors to support schools' specific learning needs. Partnering with universities or professional organizations can help to provide the support infrastructure for professional development (Jaquith, Mindich, Wei, and Darling-Hammond, 2010). Several states provide professional-development infrastructures and resources, such as Missouri's Regional Professional Development Centers, Colorado's Educator Effectiveness office, New Jersey's Professional Learning Communities Resources for Educators, The Educational Information and Resource Center, and Vermont's Educational Services Agencies.

Remember: Learning is a Journey, Not a Destination

After an extensive review of the professional-development literature, Webster-Wright (2009) proposed that educators shift the discourse from delivering and evaluating PD programmes to understanding and supporting authentic professional learning as it is situated in the everyday context where it occurs. Authentic professional learning lends itself to design thinking, an iterative cycle that includes designing, testing, troubleshooting, and redesigning.

Give Constructive Feedback

Authentic professional learning requires methods for reflection and feedback. American Institutes for Research offers a Web-based service called Professional Development Activity Log, which supports longitudinal data collection on professional development implementation and teachers' self-reported knowledge, skills, and changes in teaching practice. After extensive research on teacher evaluation procedures, the Measures of Effective Teaching Project mentions three different measures to provide teachers with feedback for growth: (1) classroom observations by peer-colleagues using validated scales such as the Framework for Teaching or the Classroom Assessment Scoring System, further described in Gathering Feedback for Teaching and Learning About Teaching, (2) student evaluations using the Tripod survey developed by Ron Ferguson from Harvard, which measures students' perceptions of teachers' ability to care, control, clarify, challenge, captivate, confer, and consolidate, and (3) growth in student learning based on standardized test scores over multiple years.

Build Trust Between Administrators and Teaching Staff

Great leaders focus on developing people's capacities rather than their limitations (Leithwood, Seashore Louis, Anderson, and Wahlstrom, 2004; Alliance for Excellent Education, 2011). Teachers generally take three to five years to develop their craft, and changes in teacher knowledge and practice must be rather large to see

changes in students' test scores. Correlational evidence shows that sizable changes in teacher-related variables are associated with much smaller changes in student learning outcomes (Hill, Rowan, and Ball, 2005; Hanushek and Rivkin, 2012). "Strong caring leadership" is a major source of support for teachers (Beltman, Mansfield, and Price, 2011).

The professional development of teachers is studied and presented in the relevant literature in many different ways. But always at the core of such endeavors is the understanding that professional development is about teachers learning, learning how to learn, and transforming their knowledge into practice for the benefit of their students' growth. Teacher professional learning is a complex process, which requires cognitive and emotional involvement of teachers individually and collectively, the capacity and willingness to examine where each one stands in terms of convictions and beliefs and the perusal and enactment of appropriate alternatives for improvement or change. All this occurs in particular educational policy environments or school cultures, some of which are more appropriate and conducive to learning than others. The instruments used to trigger development also depend on the objectives and needs of teachers as well as of their students. Thus, formal structures such as courses and workshops may serve some purposes, while involvement in the production of curricula, the discussion of assessment data or the sharing of strategies may serve other purposes. Not every form of professional development, even those with the greatest evidence of positive impact, is of itself relevant to all teachers. There is thus a constant need to study, experiment, discuss and reflect in dealing with teacher professional development on the interacting links and influences of the history and traditions of groups of teachers, the educational needs of their student populations, the expectations of their education systems, teachers' working conditions and the opportunities to learn that are open to them.

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2.2.5 Teachers' Factors Related to Student Achievement

There is considerable variance in the productivity of teachers. A one standard deviation increase in teacher quality is associated with a 0.1 to 0.2 standard deviation increase in student achievement (Aaronson, Barrow, and Sander, 2007; Kane and Staiger, 2008). If observable characteristics that predict teacher quality can be determined, they could be used to identify the most effective candidates in the hiring process. If teacher characteristics are malleable, determining which teacher characteristics have the greatest impact on student achievement could also inform the design of teacher training programmes.

Four dimensions that characterize teacher effectiveness synthesized from a meta-review of extant research and literature (Stronge, 2002, 2007) are:

Instructional Delivery

Instructional delivery includes countless teacher responsibilities that provide the connection between the curriculum and the students. Research on aspects of instructional delivery that lead to increased student learning can be examined in terms of the following areas: instructional differentiation, focus on learning, instructional clarity, instructional complexity, expectations for student learning, the use of technology, and the use of questioning.

Instructional Differentiation

Studies that have examined the instructional practices of effective teachers have found that they use direct instruction (Pressley, Wharton-McDonald, Allington, Block, & Morrow, 1998), individualized instruction (Zahorik, Halbach, Ehrle, & Molnar, 2003), discovery methods, and hands-on learning (Wenglinsky, 2000), among other practices. Although these studies examined the efficacy of specific approaches to instructional delivery, researchers have found that effective teachers are adept at using a myriad of instructional strategies (Covino & Iwanicki, 1996; Langer, 2001; Molnar et al., 1999).

Instructional Focus on Learning

Effective teachers put students on their focus until the students have accomplished their learning and completed their studies at the school. Although teachers are stressed at both academic and personal learning goals with students, they focus on providing students with basic skills and critical thinking skills to be successful (Zahorik et al., 2003). In addition, effective teachers maximize instructional time (Taylor, Pearson, Clark, & Walpole, 1999) and spend more time on teaching than on classroom management (Molnar et al., 1999).

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Instructional Clarity

Instructional clarity is related to a teacher's ability both to explain content clearly to students and to provide clear directions to students throughout instruction (Good & McCaslin, 1992; Peart & Campbell, 1999; Stronge, 2007). Indeed, one solid link between teacher skills and student achievement that has been supported by research over the past four decades is teachers' verbal ability, as measured by teacher performance on standardized assessments (Wenglinsky, 2000).

Instructional Complexity

Effective teachers recognize the complexities of the subject matter and focus on meaningful conceptualization of knowledge rather than on isolated facts, particularly in mathematics and reading (Pressley et al., 1998; Wenglinsky, 2004). One study that examined elementary and middle school students' performance on academic achievement tests found that students who received instruction that emphasized both critical thinking and memorization performed better than those in classrooms where instruction emphasized critical thinking or memorization alone (Sternberg, 2003).

Expectations for Student Learning

The ability to communicate high expectations to students is directly associated with effective teaching (Stronge, 2007). Indeed, one indicator of student dropout rates is related to the teachers' expectations (Wahlage & Rutter, 1986). A study of middle school students found that teacher expectation was a significant predictor of student achievement (Wentzel, 2002). High expectations are communicated through the planning process in which teachers focus on complex as well as basic skills and by expecting students to complete their work (Bernard, 2003). A study of first-grade students found that reading achievement was lower for students whose teachers had low expectations (Palardy & Rumberger, 2008).

Use of Technology

The literature regarding the use of technology supports its inclusion as an effective practice in teaching. Schacter (1999) found that students made greater achievement gains when they had access to technology. Technology has a greater impact on student achievement when it is used to teach higher order thinking skills (Wenglinsky, 1998), and it has been associated with encouraging critical thinking in students (Cradler, McNabb, Freeman, & Burchett, 2002).

Student Assessment

Assessment is an ongoing process that occurs before, during, and after instruction is delivered. Effective teachers monitor student learning through the use of a variety of informal and formal assessments and offer meaningful feedback to students (Hattie & Timperley, 2007). Indeed, the well-designed use of formative assessment yields gains in student achievement equivalent to one or two grade levels (Assessment Reform Group, 1999), thus having a significant impact on student achievement (Marzano, 2006). Effective teachers check for student understanding throughout the lesson and adjust instruction based on the feedback (Guskey, 1996).

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Learning Environment

The importance of maintaining a positive and productive learning environment is noticeable when students are following routines and taking ownership of their learning (Covino & Iwanicki, 1996). Classroom management is based on respect, fairness, and trust, wherein a positive climate is cultivated and maintained (Tschannen-Moran, 2000). Effective teachers nurture a positive climate by setting and reinforcing clear expectations throughout the school year, but especially at its beginning (Evertson, & Worsham, 2003). A productive and positive classroom is the result of the teacher's considering students' academic as well as social and personal needs.

Personal Qualities

One critical difference between more effective and less effective teachers is their affective skills (Emmer, Evertson, & Anderson, 1980). Teachers who convey that they care about students have higher levels of student achievement than teachers perceived by students as uncaring (Wolk, 2002). These teachers establish connections with students and are reflective practitioners dedicated to their students and to professional practice (Stronge, 2007). In addition, more effective teachers encourage students to take responsibility for themselves (Stronge et al., 2005).

Table 5 below shows factors that are related to student achievement that is derived from teachers. We can see that teachers' expectation towards students' learning is the most significant factor that has been mentioned by a lot of researchers. Other factors that also play vital roles in contributing to teachers' success in teaching their students include varieties and clarity of instruction. Others such as teachers' focus on students' learning, complexity of instruction, teachers' use of technology, learning environment and teachers' characters play equal importance as factors related to student achievement.

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Table 5 Teachers' Factors Related to Student Achievement

Researchers / Factors	Pressley, Wharton-McDonald, Allington, Block, & Morrow, (1998)	Zahorik, Halbach, Ehrle, & Molnar, (2003)	Langer, (2001)	Molnar et al., (1999)	Taylor, Pearson, Clark, & Walpole, (1999)	Good & McCaslin, (1992)	Peart & Campbell, (1999)	Stronge, (2007)	Wenglinsky, (2000)	Wenglinsky, (2004)	Sternberg, (2003)	Wahlage & Rutter, (1986)	Wentzel, (2002)	Bernard, (2003)	Palardy & Rumberger, (2008)	Wenglinsky, (1998)	Schacter (1999)	Cradler, McNabb, Freeman, & Burchett, (2002)	Hattie & Timperley, (2007)	Assessment Reform Group, (1999)	Marzano, (2006)	Covino & Iwanicki, (1996)	Tschannen-Moran, (2000)	Evertson, & Worsham, (2003)	Wolk, (2002)	Stronge, (2007)	Stronge et al., (2005)
Instructional Differentiation	✓	✓	✓	✓																							
Instructional Focus on Learning		✓		✓	✓																						
Instructional Clarity						✓	✓	✓	✓																		
Instructional Complexity	✓									✓	✓																
Expectation for Student Learning								✓				✓	✓	✓	✓												
Use of Technology																✓	✓	✓									
Assessment																			✓	✓	✓						
Learning Environment																						✓	✓	✓			
Personal Quality (Ex:Passion, Caring, Inspiration																									✓	✓	✓

2.3 Models of Continuing Professional Development

Day's (1999) definition of CPD covers all aspects of the notion: "Professional development consists of all natural learning experiences and those conscious and planned activities which are intended to be of direct or indirect benefit to the individual, group or school, which contribute, through these, to the quality of education in the classroom. It is the process by which, alone and with others, teachers review, renew and extend their commitment as change agents to the moral purpose of teaching; and by which they acquire and develop critically the knowledge, skills and emotional intelligence essential to good professional thinking, planning and practice with children, young people and colleagues throughout each phase of their teaching lives." (Day, 1999, 4).

Teachers' perceptions of what activities constitute CPD is frequently limited to attendance at courses, conferences, often to meet national requirements. Professional learning, or "on the job" learning is regularly seen by teachers as separate from CPD, and something that is just done as part of the job (Hustler et al, 2003). However, the literature points to several features of effective CPD of teachers in the USA, many of which are far removed from the commonly-held perceptions of CPD as one-off events.

According to Lieberman's classification (1996) there are three types of CPD:

1) Direct teaching (courses, conferences, workshops, consultations);

2) Learning in school (mentoring, peer coaching, action research, critical friendships and task-related planning teams);

3) Out of school learning (visits to other school, learning networks, school-university partnerships and so on).

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The area of teachers' continuing professional development (CPD) is of growing interest internationally. This part will examine the range of continuing professional development model as categorized by Kennedy (2005); there are 9 models as follow:

2.3.1 The Training Model

The training model of CPD is universally recognisable (Little, 1994; Kelly & McDiarmid, 2002) and has, in recent years, arguably been the dominant form of CPD for teachers. This model of CPD supports a skills-based, technocratic view of teaching whereby CPD provides teachers with the opportunity to update their skills in order to be able to demonstrate their competence. It is generally 'delivered' to the teacher by an 'expert', with the agenda determined by the deliverer, and the participant placed in a passive role. While the training can take place within the institution in which the

participant works, it is most commonly delivered off-site and is often subject to criticism about its lack of connection to the current classroom context in which participants work. Day (1999) identifies one of the principal difficulties as being the failure of such training events to 'connect with the essential moral purposes that are at the heart of their [teachers'] professionalism' (p. 49).

The training model of CPD is compatible with, although not always related to, a standards-based view of teacher development where teachers strive to demonstrate particular skills specified in a nationally agreed standard. The model supports a high degree of central control, often veiled as quality assurance, where the focus is firmly on coherence and standardisation. It is powerful in maintaining a narrow view of teaching and education whereby the standardisation of training opportunities overshadows the need for teachers to be proactive in identifying and meeting their own development needs. The dominant discourse in many other countries supports this notion that the standardisation of training equates to improvements in teaching, learning and pupil attainment. Indeed, Kirk et al (2003), in outlining the context for the development of the chartered teacher programme in Scotland, link the standard-based approach with an associated training model of CPD when they say that: "Statements of competence and standards, derived with the support of the profession should help to ensure that development and training are clearly related and effectively targeted at the skills and knowledge teachers require. (p. 3)"

Despite its drawbacks, the training model is acknowledged as an effective means of introducing new knowledge (Hoban, 2002), albeit in a decontextualised setting. What the training model fails to impact upon in any significant way is the manner in which this new knowledge is used in practice. Perhaps even more significantly, though, in terms of the relative power of stakeholders, the training model provides an effective way for dominant stakeholders to control and limit the agenda, and places teachers in a passive role as recipients of specific knowledge.

2.3.2 The Award-bearing Model

An award-bearing model of CPD is one that relies on, or emphasises, the completion of award-bearing programmes of study – usually, but not exclusively, validated by universities. This external validation can be viewed as a mark of quality assurance, but equally can be viewed as the exercise of control by the validating and/or funding bodies. The introduction of the chartered teacher programme in Scotland provides an interesting example of the way in which university validated award-bearing provision can become the bedrock of a particular CPD structure. While it has been argued that this, together with General Teaching Council for Scotland accreditation, provides a necessary element of quality assurance and continuity, in practice it also serves to limit the availability of other award-bearing provision

(Purdon, 2003) and to standardise the experiences of those working towards chartered teacher status.

The fundamental meaning of chartered teacher status has been the subject of extensive and public debate. Arguments have centred round the emphasis on 'professional' as opposed to 'academic' routes. This discourse of anti-intellectualism has led to accusations of the irrelevance of the 'academic' work undertaken by universities and placed emphasis instead on the practice-based element of teaching. To interpret 'professional' and 'academic' as antonyms conveys worrying messages about the conception of teacher professionalism in dominant education discourse. What this particular example illustrates is the way in which the dominant discourse has influenced providers of award-bearing courses, in turn reflecting particular ideological imperatives potentially at the expense of academic and intellectual autonomy (Kennedy, 2005).

2.3.3 The Deficit Model

Professional development can be designed specifically to address a perceived deficit in teacher performance. This may well be set within the context of performance management, which itself is subject to debate over its fundamental purpose. Rhodes & Beneicke (2003) point out that performance management can be viewed as a means of raising standards or 'as an element of government intervention to exact greater efficiency, effectiveness and accountability' (p. 124). Nonetheless, performance management requires that somebody takes charge of evaluating and managing change in teacher performance, and this includes, where necessary, attempting to remedy perceived weaknesses in individual teacher performance. What is not always clear, however, is what the expectations are for competent performance, and whose notion of competence they reflect.

While the deficit model uses CPD to attempt to remedy perceived weaknesses in individual teachers, Rhodes & Beneicke (2003) suggest that the root causes of poor teacher performance are related not only to individual teachers, but also to organisational and management practices. Indeed, to attribute blame to individual teachers, and to view CPD as a means of remedying individual weaknesses, suggests a model whereby collective responsibility is not considered, i.e. that the system itself is not considered as a possible reason for the perceived failure of a teacher to demonstrate the desired competence. It also assumes the need for a baseline measure of competence, and once this has been committed to paper, it begins to adopt an authority of its own.

Boreham (2004) discusses this issue of individual and collective competence, arguing that in the school context, effective collective competence is dependent on leadership which promotes three particular conditions, namely:

1) making collective sense of events in the workplace;

2) developing and using a collective knowledge base;

3) developing a sense of interdependency (p. 9).

This argument is clearly at odds with the notion of the deficit model which attributes blame for perceived underperformance on individuals and fails to take due cognisance of collective responsibility.

2.3.4 The Cascade Model

The cascade model involves individual teachers attending 'training events' and then cascading or disseminating the information to colleagues. It is commonly employed in situations where resources are limited. Although very popular in Scotland in the early 1990s, after local government reorganisation resulted in tighter resource allocations (Marker, 1999), this model is not quite as popular in Scotland now.

Day (1999) reports on a case study in which the cascade model was employed by a group of teachers as a means of sharing their own (successful) learning with colleagues. The group reported on what they had learned, but 'no detailed consideration was given to the very principles of participation, collaboration and ownership which had characterized their own learning' (p. 126).

In addition to such issues surrounding the conditions required for successful learning, Solomon & Tresman (1999) suggest that one of the drawbacks of this model is that what is passed on in the cascading process is generally skills-focused, sometimes knowledge-focused, but rarely focuses on values. This is an argument that is also articulated by Nieto (2003), when she claims that teacher education 'needs to shift from a focus on questions of "what" and "how" to also consider questions of "why"' (p. 395).

It could therefore be argued that the cascade model supports a technicist view of teaching, where skills and knowledge are given priority over attitudes and values. The cascade model also neglects to consider the range of learning contexts outlined by Eraut (1994), assuming that it is the knowledge per se that is the important part of the process and not necessarily the context in which it is gained or used.

2.3.5 The Standard-based Model

Before considering the characteristics of the standards-based model of CPD, it is worth giving some consideration to the terminology used. 'Standards' as opposed

to 'competences'. However, while the language has changed, in analysing the difference between the two, it is difficult to discern any real difference in either practical or philosophical terms. While the language may have shifted to hint at issues of values and commitment, etc., the real test is in the implementation of standards. Within the Scottish chartered teacher programme, for example, the emphasis is firmly on the 'professional actions', which are seen as the way of demonstrating that the standard has been met. The emphasis on evidence-based, demonstrable practice surely renders the SCT competence-based, despite claims to the contrary. Indeed, Kirk et al (2003), in writing about their experiences as members of the Chartered Teacher Project Team, state that the team was committed to the proposition that 'the assessment of potential Chartered Teachers has centrally to focus on competence in professional performance' (p. 38). It is therefore contested that, in real terms and in contrast to popular academic discourse, there is very little substantive difference between competences and standards, other than in linguistic terms.

The standard-based model of CPD belittles the notion of teaching as a complex, context-specific political and moral endeavour; rather it 'represents a desire to create a system of teaching, and teacher education, that can generate and empirically validate connections between teacher effectiveness and student learning' (Beyer, 2002, p. 243). This 'scientific' basis on which the standards movement relies limits the opportunities for alternative forms of CPD to be considered. It also relies heavily on a behaviourist perspective of learning, focusing on the competence of individual teachers and resultant rewards at the expense of collaborative and collegiate learning.

Smyth (1991) argues that externally imposed forms of accountability and inspection, such as standards, indicate a lack of respect for teachers' own capacities for reflective, critical inquiry. Indeed, this argument could be taken further to suggest that not only is it a lack of respect, but that it sets clear expectations regarding the extent to which teachers should take responsibility for their own professional learning and encourages them to be reliant on central direction, even in assessing their own capacity to teach.

There are many critics of the standard-based model of CPD. For example, Beyer (2002) criticises the lack of attention given to central and contentious questions regarding the purpose of teaching, claiming that 'teacher education must be infused with the kind of critical scrutiny about social purposes, future possibilities, economic realities and moral directions' (p. 240). He views the move towards increasing standardisation in the USA as narrowing the range of potential conceptions of teaching to focus on quality assurance and accountability. This narrowing of view is surely in direct contrast to the above expressed notion of critical scrutiny. Beyer (2002), among others, suggests that the move towards increasing standardisation in teacher education at both initial and continuing stages is in part a response to growing

concerns about nation states' abilities to compete in the global economy. In this context standardisation can thus be equated to the pursuit of improved economic status.

Despite the existence of extensive literature which is critical of the standards-based approach to teacher education, policies that adopt this approach do present a justification for its use. For example, within the context of the chartered teacher programme in Scotland, members of the development team have argued that the participative approach to the development of the Standard for Chartered Teachers will result in teachers being more willing to engage with it (Kirk et al, 2003). Arguably, standards also provide a common language, making it easier for teachers to engage in dialogue about their professional practice. However, Draper et al (2004) note the tensions inherent in the standards-based approach, warning that 'the Standard [Standard for Full Registration] itself may be seen as a useful scaffold for professional development or as a source of pressure for uniformity' (p. 221).

There is clearly capacity for standards to be used to scaffold professional development and to provide a common language, thereby enabling greater dialogue between teachers, but these advantages must be tempered by acknowledgement of the potential for standards to narrow conceptions of teaching or, indeed, to render it unnecessary for teachers to consider alternative conceptions outside those promoted by the standards.

2.3.6 The Coaching/Mentoring Model

The coaching/mentoring model covers a variety of CPD practices that are based on a range of philosophical premises. However, the defining characteristic of this model is the importance of the one-to-one relationship, generally between two teachers, which is designed to support CPD. Both coaching and mentoring share this characteristic, although most attempts to distinguish between the two suggest that coaching is more skills based and mentoring involves an element of 'counselling and professional friendship' (Rhodes & Beneicke, 2002, p. 301). Indeed, mentoring also often implies a relationship where one partner is novice and the other more experienced (Clutterbuck, 1991).

The mentoring or coaching relationship can be collegiate, for example, 'peer coaching', but is probably more likely to be hierarchical, as in, for example, the new induction procedures in Scotland (General Teaching Council for Scotland, 2002), where every new teacher is guaranteed a 'supporter' who supports the CPD process and is involved in the assessment of the new teacher's competence against the Standard for Full Registration. Key to the coaching/mentoring model, however, is the

notion that professional learning can take place within the school context and can be enhanced by sharing dialogue with colleagues.

In contrast to the novice/experienced teacher mentoring relationship, Smyth (1991) argues for a model of 'clinical supervision', which is collegiate in nature and is used by teachers for teachers. These two ends of the spectrum indicate a clear difference, in conceptual terms, of the purpose of mentoring. The novice/experienced teacher model is akin to apprenticeship, where the experienced teacher initiates the novice teacher into the profession. This initiation, while including support for the novice in gaining and using appropriate skills and knowledge, also conveys messages to the new teacher about the social and cultural norms within the institution. In direct contrast, where the coaching/mentoring model involves a more equitable relationship, it allows for the two teachers involved to discuss possibilities, beliefs and hopes in a less hierarchically threatening manner. Interestingly, depending on the matching of those involved in the coaching/mentoring relationship, this model can support either a transmission view of professional development, where teachers are initiated into the status quo by their more experienced colleagues or a transformative view where the relationship provides a supportive, but challenging forum for both intellectual and affective interrogation of practice.

Regardless of the fundamental purpose of the coaching/mentoring model as mutually supportive and challenging, or hierarchical and assessment driven, the quality of interpersonal relationships is crucial. In order for the coaching/mentoring model of CPD to be successful, participants must have well-developed interpersonal communication skills (Rhodes & Beneicke, 2002).

2.3.7 The Community of Practice Model

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There is a clear relationship between communities of practice and the mutually supportive and challenging form of the coaching/mentoring model discussed above. The essential difference between the two is that a community of practice generally involves more than two people, and would not necessarily rely on confidentiality. However, the other form of the coaching/mentoring model of CPD discussed above – the hierarchical, assessment driven model – is perhaps not as closely related to the communities of practice model.

Wenger (1998) contends that, while we are all members of various communities of practice, learning within these communities involves three essential processes:

1) evolving forms of mutual engagement;
2) understanding and tuning [their] enterprise;
3) developing [their] repertoire, styles and discourses (p. 95).

Central to Wenger's thesis is a social theory of learning, recognising that learning within a community of practice happens as a result of that community and its interactions, and not merely as a result of planned learning episodes such as courses.

However, participants' awareness of the existence of the community is surely central to their internalisation of such learning. Depending on the role played by the individual as a member of the wider team, learning within such a community could be either a positive and proactive or a passive experience, where the collective wisdom of dominant members of the group shapes other individuals' understanding of the community and its roles. Yeatman & Sachs (cited in Day, 1999, p. 183) highlight this in relation to a particular case study in Australia, where they observe that the successful community of practice 'has developed as a formal and explicit relationship between practising teachers and teacher educators.

Fundamental to successful CPD within a community of practice is the issue of power. Wenger (1998) argues that a community of practice should create its own understanding of the joint enterprise, therefore allowing the members of that community to exert a certain level of control over the agenda. For professional learning to take place within this context, it should be neither a form of accountability nor of performance management. Indeed, Wenger (1998) argues that 'negotiating a joint enterprise gives rise to relations of mutual accountability among those involved' (p. 81), therefore arguably promoting greater capacity for transformative practice than a managerial form of accountability would allow.

2.3.8 The Action Research Model

Somekh (cited in Day, 1999, p. 34) defines action research as 'the study of a social situation, involving the participants themselves as researchers, with a view to improving the quality of action within it'. The 'quality of action' can be perceived as the participants' understanding of the situation, as well as the practice within the situation.

Advocates of the action research model (Weiner, 2002; Burbank & Kauchack, 2003) tend to suggest that it has a greater impact on practice when it is shared in communities of practice or enquiry, and indeed, many communities of practice will engage in action research. However, collaboration of the nature found in a community of practice is not a prerequisite of the action research model.

Weiner (2002) discusses one particular example of research-based professional development set within the particular national context in Sweden. Key to this national context is an agreement among partners (universities, government and professional groups) that national education research needs to be more relevant to

practitioners, and that, in supporting teachers to carry out action-based research, the problem of relevance will be addressed. Weiner acknowledges that this agreement could potentially point to a number of agendas, but she concentrates primarily on this move as a means of supporting 'greater participation, relevance and democracy' (p. 3). Indeed, she claims that ' action research has practitioner development and transformation as its main aim' (p. 5).

Action research as a model of CPD has been acknowledged as being successful in allowing teachers to ask critical questions of their practice. However, Sachs (2003) queries the extent to which it allows teachers to ask such critical questions of the political determinants that shape the parameters of their practice. Nevertheless, an action research model clearly has significant capacity for transformative practice and professional autonomy

2.3.9 The Transformative Model

What is termed in this article as a 'transformative model' of CPD involves the combination of a number of processes and conditions – aspects of which are drawn from other models outlined in this article. The central characteristic is the combination of practices and conditions that support a transformative agenda. In this sense, it could be argued that the transformative model is not a clearly definable model in itself; rather it recognises the range of different conditions required for transformative practice.

Hoban (2002) provides an interesting perspective on this notion of CPD as a means of supporting educational change. He draws comparisons between the knowledge focused and contextually void model of a training approach with the context-specific approach of a communities of practice model that does not necessarily embrace new forms of formal knowledge. He suggests that what is really needed is not a wholesale move towards the teacher-centred, context-specific models of CPD, but a better balance between these types of models and the transmission focused models. Hoban's description of the two ends of the spectrum do not, however, include communities of enquiry, which might be based on partnerships between teachers, academics and other organisations, and which can involve both the context, and the knowledge required for real and sustainable educational change. Such communities take ' enquiry' as opposed to merely ' practice' as their uniting characteristic, thereby asserting a much more proactive and conscious approach than is necessarily the case in communities of practice.

According Kennedy (2005) it could be argued, then, that the key characteristic of the transformative model is its effective integration of the range of models described above, together with a real sense of awareness of issues of power,

i.e. whose agendas are being addressed through the process. While examples of this model might not be much in evidence, except for limited small-scale research activities (Nieto, 2003), it features increasingly in academic literature. Indeed, it appears to provide an antidote to the constricting nature of the standards, accountability and performance management agenda, and could arguably be categorised as a poststructuralist approach to CPD. However, an explicit awareness of issues of power means that the transformative model is not without tensions, and indeed it might be argued that it actually relies on tensions: only through the realisation and consideration of conflicting agendas and philosophies, can real debate be engaged in among the various stakeholders in education, which might lead to transformative practice.

2.4 Kennedy's Framework for Analysis of CPD Models

If the purpose of professional learning is attitudinal development—that is, changes in intellectual and motivational aspects as well as functional development (Evans, 2002)—then we must consider how this might be facilitated. Kennedy's (2005) analytical framework suggests that professional learning opportunities can be located along a continuum where the underpinning purposes of particular models of CPD can be categorised as 'transmissive', 'transitional' or 'transformative'. Models of CPD where the purpose is deemed to be transmissive rely on teacher development through externally delivered, 'expert' tuition (Sprinthall et al., 1996), focusing on technical aspects of the job rather than issues relating to values, beliefs and attitudes. This type of CPD does not support professional autonomy; rather, it supports replication and, arguably, compliance. Within the transitional models, CPD has the capacity to support either a transmissive agenda or a transformative agenda, depending on its form and philosophy. Models that fit under this category include coaching/mentoring and communities of practice. At the other end of the spectrum, transformative professional learning suggests strong links between theory and practice (Sprinthall et al., 1996), internalisation of concepts, reflection, construction of new knowledge and its application in different situations, and an awareness of the professional and political context. Transformative models of CPD have the capacity to support considerable professional autonomy at both individual and profession-wide levels.

2.5 Analysis of Characteristics of Models for Professional Development Based on Kennedy Framework (2005)

In the analysis we will extract the main characteristics from the 9 models mentioned above and analyses base on the characteristics of the 3 models proposed by Kennedy (2005) namely; transmission, transitional, and transformative. We will also apply several concepts to see the most dimensions of models proposed by Kennedy:

Lieberman's classifications (1996) there are three types of CPD:

1) Direct teaching (courses, conferences, workshops, consultations);

2) Learning in school (mentoring, peer coaching, action research, critical friendships and task-related planning teams);

3) Out of school learning (visits to other school, learning networks, school-university partnerships and so on).

Bell and Gilbert's (1996) three aspects of professional learning:

4) Personal

4.1) Teachers' beliefs, values and attitudes are important considerations.

4.2) Interest and motivation need to be addressed.

5) Social

5.1) Relationships between individuals and groups need nurturing.

5.2) Contexts need to be supportive to allow enactment and risk taking.

6) Occupational

6.1) Link between theory and practice need to be strong.

6.2) Intellectual stimulation and professional relevance are required.

Reid's quadrants of teacher learning (MacKinney et al., 2005)

Clearly, different professional learning experiences offer varying opportunities for attitudinal development. We propose analysis of professional learning opportunities according to Reid's quadrants, comprising two dimensions: formal–informal and planned–incidental (McKinney et al., 2005). Formal opportunities are those explicitly established by an agent other than the teacher (e.g. taught courses), whereas informal opportunities are sought and established by the teacher (e. g. networking). On the other axis, planned opportunities may be formal or informal, but are characteristically pre-arranged (e. g. collaborative planning), whereas incidental opportunities are spontaneous and unpredictable (e.g. teacher exchanges over coffee). These descriptions represent polarised positions that encompass the range of learning opportunities encountered by teachers.

The data presented in table 6 is offered as a way of summarizing the 'distinctiveness of each of the models proposed by Kennedy (2005). One of the key reasons for characterised models through different theories is that we can be sure to analyse the model accurately in its complexity. The following table considers three specific models of CPD using the above literatures and a framework for analysis of characteristics.

Table 6 Characteristics of Teacher Development Models Based on the concept of Kennedy (2005)

Characteristics	Type of models based on Kennedy (2005)		
	Transmission	**Transitional**	**Transformative**
Mode of deliver	Expert	Expert/community	Expert/community/interest
Participant role/leadership	Passive	Active	Passive/active
Context/job-embedded	Decontextualise	Context specific	Contextually void (Depend on change)
Mode of support	Central control	Central control/ share control	Share control
View of teacher development	Standard-based view	Standard-based view	No standard
Encourage collaboration	None	Personal/Group	Personal/Group
Reflective dialogue	None	Personal/share/ongoing	Personal/share/ongoing
Capacity for autonomy	No autonomy	Interchangeably	High autonomy
Teaching context	Direct teaching	Learning in School	Learning in school / Out of school
Domain of influence	-	Personal/social/occupational	Personal/Social/Occupational
Sphere of action	Formal/Planned	Formal/Planned, Informal/Incidental	Formal/Planned, Informal/Incidental
Autonomy	Low	High	Very High

From the table we can see that transmissive model rely on teacher development through externally delivered, 'expert' tuition focusing on technical aspects of the job rather than issues relating to values, beliefs and attitudes. This type of CPD does not support professional autonomy; rather, it supports replication and, arguably, compliance. Within the transitional models relies on both experts and community as a knowledge platform and community of practice. It reflects the reflective dialogue where constant feedback is an ongoing process. While certain level of autonomy depends on the role of the participants.

At the other end of the spectrum, transformative professional learning suggests strong links between theory and practice (Sprinthall et al., 1996), internalisation of concepts, reflection, construction of new knowledge and its application in different situations, and an awareness of the professional and political context. Transformative models of CPD have the capacity to support considerable professional autonomy at both individual and profession-wide levels.

2.6 Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge

2.6.1 Effective Teacher Professional Development and Technology Integration

Many of the characteristics of effective professional development (PD), such as collective participation of teachers, onsite facilitation, sustained period of time, and a focus on problems of practice, have been identified in the literature (Borko, Jacobs, & Koellner, 2010; Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009; DeMonte, 2013; Hung & Yeh, 2013; Jaipal & Figg, 2011; Riveros, Newton, & Burgess, 2012). At the same time, concerns have been raised about teacher professional development, especially the need to deepen teachers' knowledge of the subjects being taught, while keeping up with developments in digital learning environments made possible through ubiquitous access to digital tools (DeMonte, 2013; Johnson et al., 2013).

These concerns point to the need to reexamine the nature of the PD approach as related to digital environments and the types of learning activities included in such PD. Limited by logistical and financial demands, school boards commonly choose a workshop approach to conduct technology professional development in order to meet the demands of changing digital learning environments. However, these technology workshops are of short duration and focus on the demonstration of technical skills—promoting tool use rather than technology-enhanced teaching (Carlson & Gadio, 2002; Trucano, 2005).

Such an approach to technology professional development most often leads to technology skills being learned out of the classroom context, with teachers finding it difficult to connect the technical skills learned to subject area content and classroom practice and leading to questions about the value of the technology-enhanced instruction (Harris & Hofer, 2009; McKenzie, 2001). Research has shown that a high degree of technical competence in teachers does not necessarily translate into teaching with technology (Jaipal & Figg, 2010; Mishra, Koehler, & Kereluik, 2009). Hence, for a workshop approach to effectively promote technology professional development—in a way that changes teaching practice—the type of learning activities presented in the workshop is key.

Professional development, where teachers are taught how to teach with an appropriate tool to meet content learning goals (referred to as technology-enhanced activities and instruction), is more effective than teaching teachers technical skills (Jaipal & Figg, 2010; Kereluik, Mishra, & Koehler, 2010). In other words, technology workshops should develop teachers' knowledge about teaching with the technologies

to promote student learning of content in instructional contexts (Glazer, Hannafin, Polly, & Rich, 2009; Harris, Mishra, & Koehler, 2009; Larson et al., 2009).

For example, situating the learning of technical skills in an authentic learning activity, such as learning how to use a graphing calculator to illustrate the linear relationship between force and mass of an object in science, provides a concrete example of how to use the tool in teaching. This type of learning how to teach with technology is considered a content-centric approach, and the teacher knowledge developed through this approach is referred to as technological pedagogical content knowledge (or, more recently, technology, pedagogy, and content knowledge [TPACK]; Mishra & Koehler, 2006).

In a comparative case study examining the nature of teacher knowledge influencing technology integration in instruction among four English language arts teachers of varying years of teaching experience, Hughes (2005) found that "content-focused learning experiences yielded content-based technology integration in the classroom" (p. 295). Hughes's findings also revealed that experienced teachers with less technology experience drew on their professional knowledge to develop innovative, technology integrated activities because "veteran teachers' expertise can offer a subject matter or pedagogical-based focus to technology explorations that beginning teachers may not be able to do independently" (p. 299).

In essence, the actual use of technology in instruction was found to be influenced by teachers' perceptions of the usefulness of the technology for content and pedagogy purposes (Hughes, 2005). Teacher perceptions of the usefulness of technology is a factor proposed by the Technology Acceptance Model (TAM; Davis, 1989). The TAM model explains how users accept and use technology in terms of three factors: perceived usefulness of technology, perceived ease of use of technology, and attitude toward using the technology.

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Davis (1989) explained that, when technology is perceived as useful (enhancing job performance) and as easy to use (requiring the least amount of effort), these perceptions result in positive attitudes and intentions to accept and use technology. Perception of usefulness was found to be the major factor influencing adoption (Davis, 1993). However, Teo (2008) demonstrated in his survey of 139 preservice teachers that their attitudes and intentions to use computers were more positive than their perceptions of control of the computer and its usefulness.

Teo's finding appears to contradict Davis' notion of perceptions of usefulness and ease of use leading to positive attitudes and intentions. A possible explanation for Teo's finding is that, in education, unlike in other fields such as business, teachers in many educational jurisdictions have autonomy in the design of instructional activities to meet curriculum goals leading to more flexible job performance. Hence, while

preservice teacher experiences in their teacher education programme contribute to positive attitudes and intentions toward technology use, prior learning experiences and practicum experiences may affect their perceptions of control of technology (e.g., lack of access and technical support) and usefulness of the technology for content and pedagogical purposes (e.g., lack of technology modelling as a pedagogical strategy in content area teaching by associate teachers; Grove, Strudler, & Odell, 2004; Lei, 2009). How can perceptions of the usefulness and ease of use of technology be increased so as to instill positive attitudes and intentions toward technology that are translated into instructional practice? Based on her study findings, Hughes (2005) recommended the use of a PD approach that engages a small group of teachers in the same subject area in content-based technology inquiry as an effective way for teachers to learn how to teach with technology.

Such an approach to PD builds teacher knowledge about how to integrate technology in content areas (TPACK), demonstrating the usefulness of the technology as a pedagogical strategy to meet authentic curriculum learning goals. As well, delivering the PD in a short period of time, preferably onsite, demonstrates the ease of use of the technology within the specific context needs and constraints of teachers and school boards (e.g., covering of curriculum expectations, meeting special needs of learners, meeting school board strategic directives, negotiating constraints of rotary teaching, and limited access to digital resources).

2.6.2 Components of TPACK Framework for Professional Development

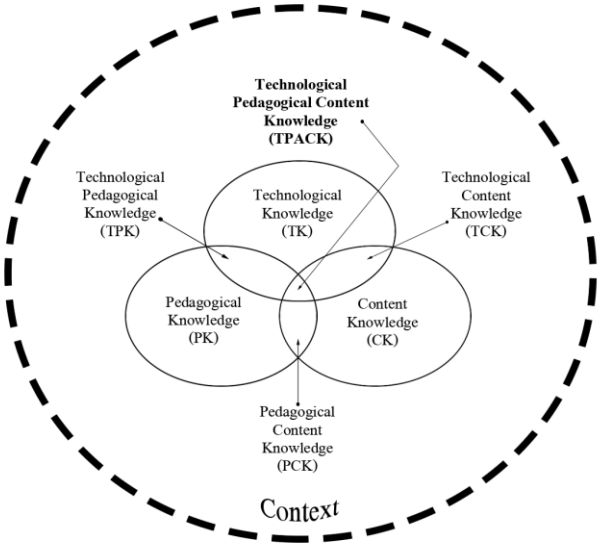

Figure 3 The Seven Components of TPACK
. (Image from *http://tpack.org*)

At the heart of the TPACK framework, is the complex interplay of three primary forms of knowledge: Content (CK), Pedagogy (PK), and Technology (TK). The TPACK approach goes beyond seeing these three knowledge bases in isolation. The TPACK framework goes further by emphasizing the kinds of knowledge that lie at the intersections between three primary forms: Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK).

Effective technology integration for pedagogy around specific subject matter requires developing sensitivity to the dynamic, transactional relationship between these components of knowledge situated in unique contexts. Individual teachers, grade-level, school-specific factors, demographics, culture, and other factors ensure that every situation is unique, and no single combination of content, technology, and pedagogy will apply for every teacher, every course, or every view of teaching.

1) Content Knowledge (CK) "Teachers' knowledge about the subject matter to be learned or taught. The content to be covered in middle school science or history is different from the content to be covered in an undergraduate course on art appreciation or a graduate seminar on astrophysics... As Shulman (1986) noted, this knowledge would include knowledge of concepts, theories, ideas, organizational frameworks, knowledge of evidence and proof, as well as established practices and approaches toward developing such knowledge" (Koehler & Mishra, 2009).

2) Pedagogical Knowledge (PK) "Teachers' deep knowledge about the processes and practices or methods of teaching and learning. They encompass, among other things, overall educational purposes, values, and aims. This generic form of knowledge applies to understanding how students learn, general classroom management skills, lesson planning, and student assessment." (Koehler & Mishra, 2009).

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3) Technology Knowledge (TK) Knowledge about certain ways of thinking about, and working with technology, tools and resources. and working with technology can apply to all technology tools and resources. This includes understanding information technology broadly enough to apply it productively at work and in everyday life, being able to recognize when information technology can assist or impede the achievement of a goal, and being able continually adapt to changes in information technology (Koehler & Mishra, 2009).

4) Pedagogical Content Knowledge (PCK) – "Consistent with and similar to Shulman's idea of knowledge of pedagogy that is applicable to the teaching of specific content. Central to Shulman's conceptualization of PCK is the notion of the transformation of the subject matter for teaching. Specifically, according to Shulman (1986), this transformation occurs as the teacher interprets the subject matter, finds multiple ways to represent it, and adapts and tailors the instructional materials to alternative conceptions and students' prior knowledge. PCK covers the core business of teaching, learning, curriculum, assessment and reporting, such as the conditions

that promote learning and the links among curriculum, assessment, and pedagogy" (Koehler & Mishra, 2009).

5) Technological Content Knowledge (TCK) – "An understanding of the manner in which technology and content influence and constrain one another. Teachers need to master more than the subject matter they teach; they must also have a deep understanding of the manner in which the subject matter (or the kinds of representations that can be constructed) can be changed by the application of particular technologies. Teachers need to understand which specific technologies are best suited for addressing subject-matter learning in their domains and how the content dictates or perhaps even changes the technology—or vice versa" (Koehler & Mishra, 2009).

6) Technological Pedagogical Knowledge (TPK) "An understanding of how teaching and learning can change when particular technologies are used in particular ways. This includes knowing the pedagogical affordances and constraints of a range of technological tools as they relate to disciplinarily and developmentally appropriate pedagogical designs and strategies" (Koehler & Mishra, 2009).

7) Technological Pedagogical Content Knowledge (TPACK) "Underlying truly meaningful and deeply skilled teaching with technology, TPACK is different from knowledge of all three concepts individually. Instead, TPACK is the basis of effective teaching with technology, requiring an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones" (Koehler & Mishra, 2009).

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The TPACK framework considers three distinct and interrelated areas of teaching, as represented by figure 2. The notion of TPACK is quickly becoming ubiquitous within the educational technology community, becoming popular among researchers and practitioners alike, as it attempts to describe the complex-relationship between and among the domains of content, pedagogy, and technology-related knowledge. However, while the theory of TPACK is compelling, more work measuring the relationship between these domains is necessary before curriculum and textbooks are re-written. Specifically, before this model is offered as the proverbial panacea for redressing the challenges of teaching the 21st century student, scholarship investigating the confusion between and among each of the domains described by the framework is needed. Cox and Graham (2009) acknowledge the difficulty and necessity in conducting such work:

While Koehler, Mishra, and others have attempted to define and measure TPACK, the framework is not yet fully understood (Angeli & Valanides, 2009). Thus far, the explanations of technological pedagogical content knowledge and its associated constructs that have been provided are not clear enough for researchers to agree on what is and is not an example of each construct. The boundaries between them are still quite fuzzy, thus making it difficult to categorize borderline cases (p. 60).

2.7 Productive Pedagogies

2.7.1 Productive Pedagogies Framework

The Productive Pedagogies framework is a recent attempt to research and reform pedagogy in Australian schools that was developed by the Queensland School Reform Longitudinal Study (QSRLS). This initiative was built upon the work of Authentic Pedagogy research by Newman and his colleges in extending the emphasis on quality and diversity of classroom pedagogy as a basis for improving students' intellectual and social outcomes (Hayes et al., 2006; Lingard, Hayes & Mills, 2003; Sellar & Cormack, 2009). The concept "Productive" is an indication of the production of learning outcomes in the classrooms (Hayes et al., 2006, p. 21). The term "Pedagogy" reflects the integration between the different aspects of teaching as science, art and practice (McLeod & Reynolds, 2007, p. 44). It refers to "the central expression of humanity in general and the professional identities and practices for teachers in particular" (Hayes et al. 2006, p. 21; Lingard, 2005, p. 172). The concept of "Pedagogies" reflects the description of the range of various texts on classroom practices rather than the many examples of teaching strategies (Hayes et al., 2006, p. 77).

The Productive Pedagogies framework emphasises the centrality of teachers in improving the academic and social outcomes of all students. It provides a useful lens to analyse and examine the richness, complexity and other aspects of classroom experiences. While the concept of Productive Pedagogies focuses on the role of teachers and pedagogies to provide quality classroom practices, it emphasises that the responsibility of the quality must be communal, involving teachers, school administrators, education organizations and local communities (Lingard et al., 2003). The Productive Pedagogies framework has been used in pre-service and in-service teacher education programmes as a comprehensive framework and multidimensional construct for quality teaching model and as an means for teachers to reflect on their pedagogical practices, to inform the design of quality learning experiences and to enter into dialogue with the community of teachers about issues related to teaching and learning (Atweh, 2007; Education Queensland, 2010; Gore et al., 2004).

2.7.2 Productive Pedagogies Dimensions

The twenty Productive Pedagogies under the four dimensions are constructed in the Productive Pedagogies Classroom Reflection Manual, as a guide from Queensland Education, to provide an index of quality teaching and students' learning and to be used to help teachers to reflect on their classroom practices and generating professional development dialogue. It could also be used to assist designing curriculum and learning experiences and help making intelligent decisions about individual student's needs (Education Queensland, 2010b).

Productive Pedagogies dimensions

The dimensions of the Productive Pedagogies framework, namely, intellectual quality, connectedness, supportive classroom environment, and working and valuing difference (Hayes et al., 2006), express the meaning and value of what "quality teaching" might look like and provide a descriptive language to support and engage teachers with sustained professional dialogue about their practices and performances in order to provide "critical friends' comments" (Atweh, 2007a, p. 13; Aveling & Hatchell, 2007; Education Queensland, 2010b; Hayes et al., 2006). These four dimensions can provide teachers with a snapshot of their classroom practices that should be present to ensure that the intellectual and social outcomes of all students are improved (Hayes et al., 2006).

Intellectual quality dimension

The focus on high intellectual quality is necessary for all students to perform well academically across the curriculum. The intellectual quality dimension of the Productive Pedagogies framework stresses the importance of providing students with intellectually challenging work including engaging them in higher order thinking operations as well as sustained conversational dialogue among students, and between teacher and students to negotiate understanding of subject matter. The Productive Pedagogies framework argues that achieving high intellectual quality also includes an understanding of knowledge as being socially constructed, establishing relatively complex connections to the central learning concepts, demonstrating a deep understanding of those concepts and promoting high levels of talk and writing within classroom practices (Education Queensland, 2010a, pp. 3-9).

Connectedness dimension

Connected pedagogical approaches make positive difference to students' attitudes, participation and achievement (Zyngier, 2008). In the Productive Pedagogies framework, the connectedness dimension aims to ensure that students are presented with practical, real, or hypothetical problems that have value and meaning beyond the instructional context and that make a connection to the student's background knowledge and experience, the other subject areas and the wider social context in which students live (Education Queensland, 2010a, pp. 10-14).

Supportive classroom environment dimension

The supportive classroom environment dimension is based on the understanding that a focus on high intellectual quality and connectedness will not be a sufficient condition for improved student outcomes, especially for students from disadvantaged backgrounds (Education Queensland, 2010a, p. 8). The dimension of supportive classroom environment emphasizes the importance of supporting students by conveying high expectations to them, applying student-centred learning activities, demonstrating self-regulation and academic engagement and providing students with frequent and detailed statements about their performance (Education Queensland, 2010a, pp. 15-19).

Recognition of difference dimensions

Within the diverse literature on teaching and learning, the emphasis is on recognizing and valuing a range of cultures and social groups to help create a sense of community and identity. The dimension of working and valuing difference provides an insight that different cultures are equally valued in all curriculum knowledge, content and form. It encourages the attempts made to ensure that all individuals and groups have rights and responsibilities (Education Queensland, 2010a, pp. 20-24). Under the notion of this dimension, the style of teaching that is principally narrative is encouraged including the use of personal stories, biographies, historical accounts, and literary and cultural texts (Education Queensland, 2010a, p. 17).

2.7.3 Summary of Productive Pedagogies Dimensions

Productive pedagogy (PP) has four dimensions:

1) Intellectual quality
2) Connectedness
3) Supportive classroom environment
4) Recognition of difference

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More broadly, PP principles challenge conventional understandings about what is important and what should be emphasised in teacher education programmes. It suggests a re-thinking of what is offered and what is valued. In particular, according to the principles of PP require teacher educators to address (Gore et al., 2004):

1) The overemphasis on classroom environments and processes rather than on substance and purposes.

2) The relationships between foundational studies, curriculum studies and field experiences which are currently insufficiently connected.

3) The purpose and structure of field experiences which centre too often on practising teaching techniques with relatively little concern for what is being taught and the quality of learning produced.

4) The focus on student management relative to student learning, which mistakenly assumes that management should be addressed first and separately.

5) The emphasis on syllabus content and constraints of the formal curriculum relative to identifying central concepts and producing depth of understanding.

Table 7 Productive pedagogy dimensions summary table, items and key questions addressed (The State of Queensland, Department of Education, 2002)

Intellectual quality	
Higher order thinking	Are students using higher-order thinking operations within a critical framework?
Deep knowledge	Does the lesson cover operational fields in any depth, detail or level of specificity?
Substantive conversation	Does classroom talk lead to sustained conversational dialogue between students, and between teacher and students, to create or negotiate understanding of subject matter?
Knowledge problematic	Are students critically examining texts, ideas and knowledge?
Metalanguage	Are aspects of language, grammar and technical vocabulary being given prominence?
Connectedness	
Knowledge integration	Does the lesson integrate a range of subject areas?
Background knowledge	Are links with students' background knowledge made explicit?
Connectedness to the world	Is the lesson, activity or task connected to competencies or concerns beyond the classroom?
Problem-based curriculum	Is there a focus on identifying and solving intellectual and/or real-world problems?
Supportive classroom environment	
Student direction	Do students determine specific activities or outcomes of the lesson?
Social support	Is the classroom characterized by an atmosphere of mutual respect and support between teacher and students, and among students?
Academic engagement	Are students engaged and on-task during the lesson?
Explicit quality performance criteria	Are the criteria for judging the range of student performance made explicit?
Self-regulation	Is the direction of student behavior implicit and self-regulatory?

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Table 7 Productive pedagogy dimensions summary table, items and key questions addressed (The State of Queensland, Department of Education, 2002) (continued)

Recognition of difference	
Cultural knowledge	Are non-dominant cultures valued?
Inclusivity	Are deliberate attempts made to ensure that students from diverse backgrounds are actively engaged in learning?
Narrative	Is the style of teaching principally narrative or is it expository?
Group identity	Does the teaching build a sense of community and identity?
Active citizenship	Are attempts made to encourage active citizenship within the classroom?

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CHAPTER 3

METHODOLOGY

3.1 Research Design

This research study aims to develop the conceptual framework, study current and desirable states of private school teacher development based on the concepts of TPACK and productive pedagogies as well as to propose a private school teacher development model based on the concepts of TPACK and productive pedagogies. This research applies a multiphase mixed-methods approach (Creswell & Plano Clark, 2007: 85, Creswell & Plano Clark, 2011: 5), exploring qualitative data first and then quantitative data to develop a model for private school teacher development model. The objectives of this study are as follows:

1. To develop a conceptual framework for private school teacher development based on the concepts of TPACK and productive pedagogies.
2. To study the current and desirable states of private school teacher development based on the concepts of TPACK and productive pedagogies.
3. To propose a private school teacher development model based on the concepts of TPACK and productive pedagogies.

3.2 Research Processes

There are three phases in the research as follows:

Phase 1 Review related literatures to formulate a conceptual framework for private school teacher development model based on the concepts of TPACK and productive pedagogies. (Research objective 1)

Phase 2 Study and analyse current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies. (Research objective 2)

Phase 3 Develop a private school teacher development model based on the concepts of TPACK and productive pedagogies. (Research objective 3)

Phase 1 Review related literatures to formulate conceptual framework for private school teacher development model based on the concepts of TPACK and productive pedagogies. There are three steps as follows:

Step 1 Review literature in the areas of teacher development, out-of-field teachers, TPACK, professional development models, and productive pedagogies as well as other related literatures to formulate a conceptual framework.

Sources

Sources for formulating a conceptual framework from the literatures studied are as follows:

1) Continuing Professional Development Models refers to a model based on Kennedy's (2005) analytical framework suggests that professional learning opportunities can be located along a continuum where the underpinning purposes of particular models of CPD can be categorised as 'transmissive', 'transitional' or 'transformative'.

2) The concept of technological pedagogical content knowledge refers to the complex interplay of three primary forms of knowledge which serves as a guideline for the domain of knowledge in this research. The primary knowledge domain consists of: Content (CK), Pedagogy (PK), and Technology (TK) and the kinds of knowledge that lie at the intersections between three primary forms: Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK) (Koehler & Mishra, 2009).

3) Productive Pedagogies refers to the twenty Productive Pedagogies under the four dimensions that are constructed in the Productive Pedagogies Classroom Reflection Manual, as a guide from Queensland Education, to provide an index of quality teaching and students' learning and to be used to help teachers to reflect on their classroom practices and generating professional development dialogue. Productive pedagogies dimensions, items and key questions addressed (The State of Queensland, Department of Education, 2002).

4) The concept of professional development designing process of Loucks-Horsley et al. (2003) will be used to help develop a model that better copes with changes and out-of-field teachers' needs. There are six steps in the process, which are 1. Commit to vision and standards. 2. Analyse learning data. 3. Set goals. 4. Plan and select strategies. 5. Implement the strategies. 6. Evaluate.

Research Instrument and Analysis

The research instrument used was content analysis of related literatures to synthesize the information from the related literatures to propose a conceptual framework for private school teacher development model based on the concepts of TPACK and productive pedagogies.

Step 2 Evaluate the appropriateness of the proposed conceptual framework on private school teacher development model based on the concepts of TPACK and productive pedagogies.

Source

Informants were four experts chosen by purposive sampling method and the criteria are as follows:

1) The experts have a good understanding and knowledge about teacher development, professional development, pedagogies, and educational administration.

2) The experts hold at least a doctoral degree or have experience in educational administration, teacher development, professional development, or pedagogies for at least 3 years.

Research Instrument and Analysis

The instrument used was conceptual framework evaluation form. The form consists of three parts:

Part 1 Expert's background information

Part 2 Appropriateness evaluation of the conceptual framework

Part 3 Suggestions and comments regarding private school teacher development model based on the concepts of TPACK and productive pedagogies

The conceptual framework evaluation form applied the IOC (Item-objective congruency index) evaluation method on "Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies" in order to gain useful feedback from the experts towards the conceptual framework of this research as well as the appropriateness in the application of the conceptual framework in order to construct the research instrument to collect data. IOC was used to validate the appropriateness of the statement in each item.

The IOC form was used to measure the content validity based on the following criteria (Rovinelli, Richard J.; Hambleton, Ronald K., 1976):

+1 means the components of the conceptual framework is appropriate

0 means the components of the conceptual framework is unclear

-1 means the components of the conceptual framework is not appropriate

The evaluation then used mean ($\bar{X}$) and standard deviation (S.D.) to calculate the IOC.

Step 3 Adjust and finalise conceptual framework of private school teacher development model based on the concepts of TPACK and productive pedagogies.

Source

Information received from experts and the beforehand conceptual framework.

Phase 2 Study and analyse current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies.

Step 1 Study and analyse current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies.

Population and informants

1) The population in this research was 3,776 schools under Office of Private Educational Commission (Ministry of Information and Communication Technology, 2013).

2) The sample population in this research was 352 schools under Office of Private Educational Commission. The sample number was calculated using Krejcie and Morgan equation (Krejcie & Morgan, 1970).

3) The informants in this research were 352 administrators and 352 out-of-field teachers from 352 schools at the Office of Private Education Commission. The informants were chosen by simple random sampling and purposive sampling methods using data from Office of Private Education Commission. There are three steps in the multi-stage random sampling in this research:

3. 1) Purposive sampling of schools based on the geographic location of schools located in both urban and rural parts of Thailand.

3.2) Purposive sampling of school based on the size of schools. Schools consist of less than 121 students are categorised as small-sized schools, while schools with 121-600 students are categorised as medium-sized schools, 601-1,500 students are categorised as large-sized schools, and more than 1,500 students are categorised as extra-large-sized schools.

3.3) Simple random sampling was used to categorise schools as a sample population based on geographical areas and size of schools.

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Table 8 Research Sampling

Areas / School Size	Urban Area						Rural Area					
	Central (106)	East (7)	North East (24)	North (12)	West (4)	South (21)	Central (24)	East (15)	North East (52)	North (19)	West (8)	South (60)
Small (1-120 students)	25	1	5	2	1	3	5	4	15	6	2	14
Medium (121-600) students	50	3	11	5	1	10	11	5	28	10	3	31
Large (601-1,500 students)	18	2	5	3	1	4	6	4	7	2	2	12
Extra Large (more than 1,500 students)	13	1	3	2	1	4	2	2	2	1	1	3
	106	7	24	12	4	21	24	15	52	19	8	60
	174						178					
Informants	174 (Administrators)			174 (Out-of-Field Teachers)			178 (Administrators)			178 (Out-of-Field Teachers)		
Grand Total	352 Schools						704Informants					
Returned Questionnaires	163 Schools						326 Informants					

Research Instrument and Analysis

The questionnaire was used as an instrument to study the current and desirable states of private school teacher development in private schools. The questionnaire consisted of two parts.

Part 1 Checklist on the background of the school and informants such as school size, number of out-of-field teachers in school, geographical location, gender, age, title, qualification, out-of-field subjects taught, level of education (primary or secondary) etc.

Part 2 Questions on the current and desirable states of private school teacher development, professional development model, technological pedagogy content knowledge, and productive pedagogies; this was on a rating scale of 5.

The questionnaire used Likert-scale to report the current and desirable states of private school teacher development in private schools by the informants. Each item entails the following description:

5 = the informants agree that

- The current practice is very high at 81-100%
- The desirable practice need for private school teacher development is very high at 81-100%

4 = the informants agree that

- The current practice is high at 61-80%
- The desirable practice need for private school teacher development is high at 61-80%

3 = the informants agree that

- The current practice is moderate at 41-60%
- The desirable practice need for private school teacher development is moderate at 41-60%

2 = the informants agree that

- The current practice is low at 21-40%
- The desirable practice need for private school teacher development is low at 21-40%

1 = the informants agree that

- The current practice is very low at 20% or less
- The desirable practice need for private school teacher development is very low at 20% or less

The information from the evaluation form was on the Likert scale of 5 and the mean criteria are interpreted as follows:

5.00-4.50 means that the current practice is very high or the desirable need is very high.

4.49-3.50 means that the current practice is high or the desirable need is high.

3.49-2.50 means that the current practice is moderate or the desirable need is moderate.

2.49-1.50 means that the current practice is low or the desirable need is low.

1.49-1.00 means that the current practice is very low or the desirable need is very low.

Instrument Development

The details of the development of the questionnaire about current and desirable states of private school teacher development are as follows:

1) Study related literatures and main concepts relating to out-of-field teacher development and analyse the items needed in the questionnaire based on the conceptual framework created in phase 1.

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Chulalongkorn University

2) Develop the questionnaire to study about current and desirable states of out-of-field teacher development and cross check with the advisors to revise the questionnaire.

Content Validation of the Instrument

Verify the content validity by experts who have background in educational administration and professional development of teachers. The experts were chosen through purposive sampling method.

The IOC form was used to measure the content validity based on the following criteria (Rovinelli, Richard J.; Hambleton, Ronald K., 1976):

+1 means the statement is appropriate
0 means the statement is unclear
-1 means the statement is not appropriate

The IOC (Item-Objective Congruence Index) was used to find the consistency of statement.

$$IOC = \frac{\sum R}{N}$$

IOC means the index of congruence
R means scores from the opinion of the experts
N means number of the experts

There were two ways to interpret the IOC value:

1) When IOC was higher than or equal to 0.5, the statement was valid.

2) When IOC was less than 0.5, the statement was incorrect, or the content was invalid and needed revision. If the result from the IOC evaluation showed that all the items index was above 0.5, it means that this questionnaire was valid and eligible to use.

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3) Consult with the advisors if there are any necessary changes to be made before sending the questionnaire for a try-out but there were no changes necessary.

4) Revise the questionnaire based on the experts' comments, bringing it to a try-out in a population of 30 participants with similar characteristics of the research samples. The examination for Cronbach's Alpha coefficient suggested 0.998 for both current and desirable statuses of private school teacher development based on the concepts of TPACK and productive pedagogies. The result supported the item-objective congruence. The data analysis procedure employed descriptive statistics, i.e. frequency and percentage of respondents' general information, mean and standard deviation in the analysis of the current and desirable statuses of private school teacher development based on the concept of TPACK and productive pedagogies.

Data collecting

The researcher sent out a questionnaire package, which included two sets of questionnaires for each school. One of the questionnaires was for an administrator of the school and the other one was for an out-of-field teacher who is currently working at the school. The questionnaires were sent out to 352 schools to collect the data via mail and an attachment to request for cooperation for collecting data to each school as well as instruction of how to answer and return the questionnaires to the researcher. The data obtained was then used for further analysis.

Data analysis

The analysis of this part deployed descriptive analysis and consisted of two parts. The researchers used SPSS programme to analyse the frequency, percentage, mean , standard deviation and Modified Priority Needs Index (PNI modified) of the data, following these four steps.

1) Analyse the background data from the questionnaires. Frequency and percentage were applied in the analysis.

2) Analyse the current and desirable states of private school teacher development based on the concepts of TPACK and Productive Pedagogies. The questionnaire was designed on the Likert scale of 5. Therefore, means and standard deviation were applied in the calculation.

3) Analyse the priority needs index (PNI modified) of private school teacher development based on the concepts of TPACK and productive pedagogies.

4) Rearrange the data based on priority needs index (PNI modified) of private school teacher development based on the concepts of TPACK and productive pedagogies.

Source

Priority needs index of private school teacher development based on the concepts of TPACK and Productive Pedagogies

Data Analysis

The researcher analysed and compared priority needs index in each of the following area; Development models, TPACK, and Productive Pedagogies. Next step the researcher arranged the order of the values of $PNI_{Modified}$ from highest to lowest; the researcher then calculated the $PNI_{Modified}$ means for each of the area.

After the researcher calculated the $PNI_{Modified}$ mean, the researcher then selected the models that have $PNI_{Modified}$ value more than $PNI_{Modified}$ mean in the development model category and repeated the same process for TPACK and Productive Pedagogies as well.

The result obtained from the analysis was the priority needs for the development of private school teacher development model based on the concepts of TPACK and Productive Pedagogies.

Phase 3 Propose a private school teacher development model based on the concepts of TPACK and productive pedagogies. There were four steps as follows:

1) Analyse priority needs index of teacher development models, TPACK, and productive pedagogies. Arrange the value of $PNI_{Modified}$ in order from highest to lowest and find the mean $PNI_{Modified}$ for each of the area above.

2) Draft the first teacher development model by using the components from teacher development model, TPACK, and productive pedagogies that have $PNI_{Modified}$ values above the mean $PNI_{Modified}$ to compose the first draft of teacher development model.

3) Contact 20 experts with expertise on teacher development, TPACK, productive pedagogies, and educational administration areas to rate the questionnaire on the appropriateness and feasibility of the first draft of teacher development model.

4) Analyse the result received from the questionnaire and amend the first draft to propose the second draft of the teacher development model.

5) Propose the second draft of the teacher development model in a focus group of 12 experts based on teacher development, teacher's knowledge, pedagogies, and educational administration areas to evaluate the second draft of the teacher development model. Then analyse the information received from each expert and finalise the final teacher development model.

Research Instrument and Analysis

The questionnaire was designed to verify the appropriateness and feasibility of the model proposed. The questionnaire consisted of four parts.

Part 1 Checklist on the background of the experts such as educational field, job title, and workplace.

Part 2 Questions on the appropriateness of the main components of the proposed model namely; name of the proposed model, significance and development of the proposed model, objectives of the proposed model, characteristics of the proposed model, application of the proposed model, and measurement and evaluation of the proposed model.

Part 3 Questions on the appropriateness and feasibility of the sub-components of the proposed teacher development model, technological pedagogy content knowledge, and productive pedagogies; this was on a rating scale of 5.

The questionnaire used Likert-scale to report the frequency by the informants. Each item entails the following description:

5 = Very high appropriateness and feasibility
4 = High appropriateness and feasibility
3 = Moderate appropriateness and feasibility
2 = Low appropriateness and feasibility
1 = Very low appropriateness and feasibility

The information from the evaluation form was on Likert scale of 5 and the mean criteria are interpreted as follows:

5.00-4.50 means that evaluators agree to the appropriateness of the contents and feasibility of the model and there is a very high possibility of implementing the model.

4.49-3.50 means that evaluators agree to the appropriateness of the contents and feasibility of the model and there is a high possibility of implementing the model.

3.49-2.50 means that evaluators agree to the appropriateness of the contents and feasibility of the model and there is a moderate possibility of implementing the model.

2.49-1.50 means that evaluators agree to the appropriateness of the contents and feasibility of the model and there is a low possibility of implementing the model.

1.49-1.00 means that evaluators agree to the appropriateness of the contents and feasibility of the model and there is a very low possibility of implementing the model.

Part 4 Open-ended suggestion regarding the proposed model.

Instrument Development

The details of the development of the questionnaire of appropriateness and feasibility of the proposed model are as follows:

1) Study related literatures and main concepts of teacher development, TPACK, and productive pedagogies and analyse the items needed in each component of the proposed model for the questionnaire.

2) Develop the questionnaire and cross-check with the advisors to revise the questionnaire.

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Content Validation of the Instrument

Verify the content validity by experts who have background in educational administration and professional development of teachers. The experts were chosen through purposive sampling method.

The IOC form was used to measure the content validity based on the following criteria (Rovinelli, Richard J.; Hambleton, Ronald K., 1976):

+1 means the statement is appropriate
0 means the statement is unclear
-1 means the statement is not appropriate

The IOC (Item-Objective Congruence Index) was used to find the consistency of statement.

$$IOC = \frac{\sum R}{N}$$

IOC means the index of congruence
R means scores from the opinion of the experts
N means number of the experts

There were two ways to interpret the IOC value.

1) When IOC was higher than or equal to 0.5, the statement was valid.

2) When IOC was less than 0.5, the statement was incorrect or the content was invalid and needed revision.

The result from the IOC evaluation shows that all the items index was above 0.5, which means that this questionnaire was valid and eligible to use.

Evaluation and adjustment on a private school teacher development model based on the concepts of TPACK and productive pedagogies by focus group discussion with experts (Finalise the final model)

In this part of the research, the researcher evaluated the contents, appropriateness of the second proposed model and the feasibility of implementing the model. The researcher did focus group discussion with 12 experts in the area of teacher development, pedagogies, and educational administration to reflect opinions and feedback on the detailed issues to finalise the proposed model. These are the processes to finalise teacher development model.

The researcher requested the letter of invitation to focus group from the university for 12 experts including experts in teacher development, pedagogies, and educational administration.

1) The researcher coordinated with the experts about the venue, time, and brief details of the focus group.

2) The researcher conducted the focus group.

3) The research used the information gathered from the focus group and the experts' evaluation to amend and finalise the final teacher development model.

4) The researcher presented to the advisors to see if there are any adjustments needed.

5) The research can then publish the teacher development model for private schools.

Table 9 Research Procedures

Research processes	Research Procedures/ Methods Multiphase mixed-methods approach	Results
1. Review of related literatures to formulate the conceptual framework for private school teacher development based on the concepts of TPACK and productive pedagogies.	1. Review related literatures on: 1.1 Teacher Development Model 1.2 TPACK 1.3 Productive Pedagogies 1.4 Processes for Model Development 2. Qualitative research Conduct a semi-structured interview with 5 experts and adjust the conceptual framework. 3. Finalise the conceptual framework.	Conceptual framework for private school teacher development based on the concepts of TPACK and productive pedagogies.
2. Study and analysis of current and desirable states of private school teacher development based on the concepts of TPACK and productive pedagogies.	1. Quantitative research Develop a questionnaire for 352 administrators and 352 private school teachers in 352 schools related to current and desirable states of private school teacher development based on the concepts of TPACK and productive pedagogies. Instrument: questionnaire	Current and desirable states of private school teacher development based on the concepts of TPACK and productive pedagogies.
3. Development of a private school teacher development model based on the concepts of TPACK and productive pedagogies.	1. Analyse and use the result from the questionnaire on current and desirable states of private school teacher development based on the concepts of TPACK and productive pedagogies to develop the model. 2. Indicate the components of the model. 3. Develop the model. Instrument: descriptive analysis, $PNI_{Modified}$	Private school teacher development model based on the concepts of TPACK and productive pedagogies (1st Draft)

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Table 9: Research Procedures (continued)

Research processes	Research Procedures/ Methods Multiphase mixed-methods approach	Results
4. Evaluation 1 - evaluation and adjustment on private school teacher development model based on the concepts of TPACK and productive pedagogies by experts.	1. Validate the proposed model with 20 experts. (5 academic experts in the field of education administration and 5 experts in the field of pedagogy, 5 school administrators, and 5 experts in teacher development) 2. Adjust the model based on experts' suggestions. Instrument: Evaluation form	Private school teacher development model based on the concepts of TPACK and productive pedagogies by experts (2nd Draft)
5. Focus Group - evaluation and adjustment on a private school teacher development model based on the concepts of TPACK and productive pedagogies by focus group discussion with experts.	1. Focus group with 12 experts who have knowledge and experience in educational administration and pedagogies. The experts include 3 academic experts in the field of educational administration, 3 academic experts in the field of pedagogy, 3 school administrators, and 3 experts in teacher development. Instrument: Evaluation form	Private school teacher development model based on the concepts of TPACK and productive pedagogies by focus group discussion with experts (Final model)

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CHAPTER 4

RESERCH ANALYSIS AND FINDINGS

The research on private school teacher development model based on the concepts of TPACK and productive pedagogies applied multiphase mixed methods design, which include quantitative research and qualitative research. The population was 3,776 schools under the office of private education commission and the sample was 352 schools chosen through multi-stages random sampling method based on geographical locations, urban and rural areas, and school size. The informants were 352 school administrators and 352 out-of-field teachers, a total of 704 people. The research instruments used were conceptual framework evaluation form, current and desirable characteristics questionnaire, evaluation form to testify the feasibility and appropriateness of the model, and expert group conversation. Percentage (%), frequency (f), mean ($\bar{X}$), standard deviation (S.D.) and PNI modified were used for quantitative data analysis while content analysis was used for qualitative data. The analysis and findings are as follows:

4.1 Conceptual framework for private school teacher development model based on the concepts of TPACK and productive pedagogies

4.1.1 Conceptual framework for private school teacher development model based on TPACK and productive pedagogies (Draft)

4.1.2 Appropriateness of conceptual framework for private school teacher development model of TPACK and productive pedagogies (Draft)

4.1.3 Conceptual framework for private school teacher development model based on the concepts of TPACK and productive pedagogies (Final)

4.2 Current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies include:

4.2.1 Informant background

4.2.2 Current and desirable states

4.2.3 Priority needs, strengths and weaknesses of current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies

4.3 Private school teacher development model "ACCT teacher development model" (1st draft)

4.4 Appropriateness and feasibility of Private school teacher development model "ACCT teacher development model" (1st draft) by experts

4.5 Private school teacher development model "ACCT teacher development model" (2nd draft)

4.6 Appropriateness and feasibility of Private school teacher development model "ACCT teacher development model" (2nd draft) by focus group experts

4.7 Private school teacher development model "ACCT teacher development model" (Final model)

The following are details of each step.

4.1 Conceptual framework for private school teacher development based on the concepts of TPACK and productive pedagogies

4.1.1 Conceptual framework for private school teacher development model based on TPACK and productive pedagogies (Draft)

The researcher studied related literatures, theories, and researches related to 1) teacher development model, and 2) Teacher's knowledge on TPACK and productive pedagogies. The researcher then drafted the conceptual framework on private school teacher model based on the concepts of TPACK and productive pedagogies and presented to advisors to revise the conceptual framework. The first draft of the conceptual framework is presented herewith:

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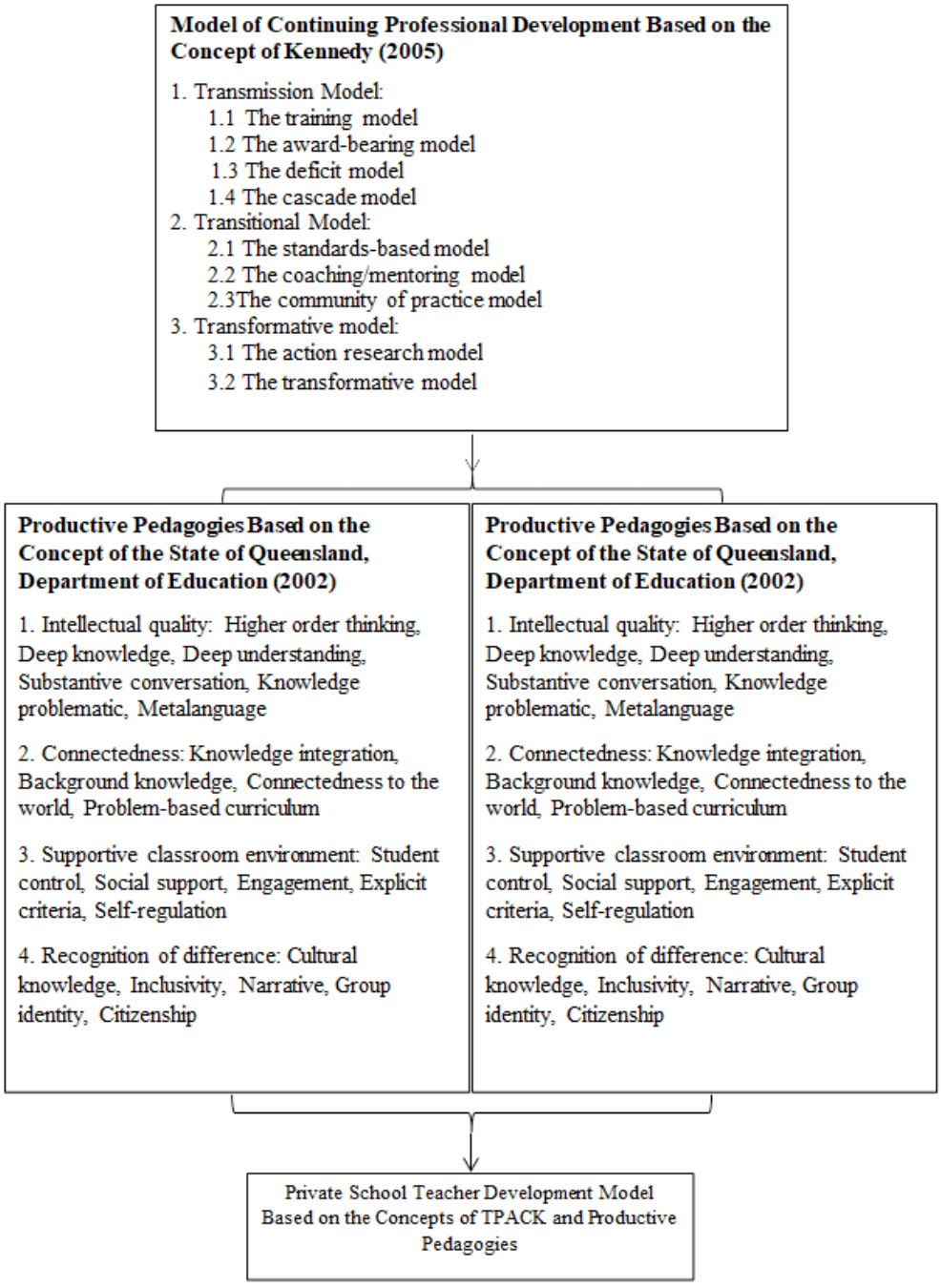

Figure 4 Conceptual Framework (Draft)

4.1.2 Appropriateness of conceptual framework for private school teacher development model based on the concepts of TPACK and productive pedagogies (Draft)

The evaluation of the appropriateness of the (draft) conceptual framework from 2 experts in educational administration field and 2 experts on teacher's knowledge, a total of 4 experts. The analysis of the evaluation of the appropriateness and feasibility of the (draft) conceptual framework is presented below.

Table 10 The evaluation of (draft) conceptual framework on private school teacher development model based on the concepts of TPACK and productive pedagogies

Items	Evaluation			Total
	Appropriate	Need Adjustment	Inappropriate	
	Frequency	Frequency	Frequency	
Teacher Development Models				
1. Transmission Model	4	0	0	1.00
1.1 The Training Model	4	0	0	1.00
1.2 The Award-bearing Model	4	0	0	1.00
1.3 The Deficit Model	4	0	0	1.00
1.4 The Cascade Model	4	0	0	1.00
2. Transitional Model	4	0	0	1.00
2.1 The Standard-Based Model	4	0	0	1.00
2.2 The Coaching/Mentoring Model	4	0	0	1.00
2.3 The Community of Practice Model	4	0	0	1.00
3. Transformative Model	4	0	0	1.00
3.1 The Action Research Model	4	0	0	1.00
3.2 The Transformative Model	4	0	0	1.00

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Table 10 The evaluation of (draft) conceptual framework on private school teacher development model based on the concepts of TPACK and productive pedagogies (continued)

Items	Evaluation			Total
	Appropriate	Need Adjustment	Inappropriate	
	Frequency	Frequency	Frequency	
Productive Pedagogies				
1. Intellectual Quality	4	0	0	1.00
1.1 Higher Order Thinking	4	0	0	1.00
1.2 Deep Knowledge	4	0	0	1.00
1.3 Deep Understanding	4	0	0	1.00
1.4 Substantive Conversation	4	0	0	1.00
1.5 Knowledge Problematic	4	0	0	1.00
1.6 Metalanguage	4	0	0	1.00
2. Connectedness	4	0	0	1.00
2.1 Knowledge Integration	4	0	0	1.00
2.2 Background Knowledge	4	0	0	1.00
2.3 Connectedness to the World	4	0	0	1.00
2.4 Problem-based Curriculum	4	0	0	1.00
3. Supportive Classroom Environment	4	0	0	1.00
3.1 Student Control	4	0	0	1.00
3.2 Social Support	4	0	0	1.00
3.3 Engagement	4	0	0	1.00
3.4 Explicit Criteria	4	0	0	1.00
3.5 Self-regulation	4	0	0	1.00

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Table 10 The evaluation of (draft) conceptual framework on private school teacher development model based on the concepts of TPACK and productive pedagogies (continued)

Items	Evaluation			Total
	Appropriate	Need Adjustment	Inappropriate	
	Frequency	Frequency	Frequency	
4. Recognition of Difference	4	0	0	1.00
4.1 Cultural Knowledge	4	0	0	1.00
4.2 Inclusivity	4	0	0	1.00
4.3 Narrative	4	0	0	1.00
4.4 Group Identity	4	0	0	1.00
4.5 Citizenship	4	0	0	1.00
Content areas of Technological Pedagogical Content Knowledge				
1. Content Knowledge	4	0	0	1.00
2. Pedagogical Knowledge	4	0	0	1.00
3. Technological Knowledge	4	0	0	1.00
4.Pedagogical Content Knowledge	4	0	0	1.00
5.Technological Content Knowledge	4	0	0	1.00
6. Technological Pedagogical Knowledge	4	0	0	1.00
7.Technological Pedagogical Content Knowledge	4	0	0	1.00

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From the table it is found that the evaluation of (draft) conceptual framework was appropriate; all the items in the conceptual framework were rated 1.00, which means that the items are appropriate to be used as conceptual framework. There were some suggestions on the adjustment of some wording for better understanding.

4.1.3 Conceptual framework for private school teacher development model based on the concepts of TPACK and productive pedagogies (Final)

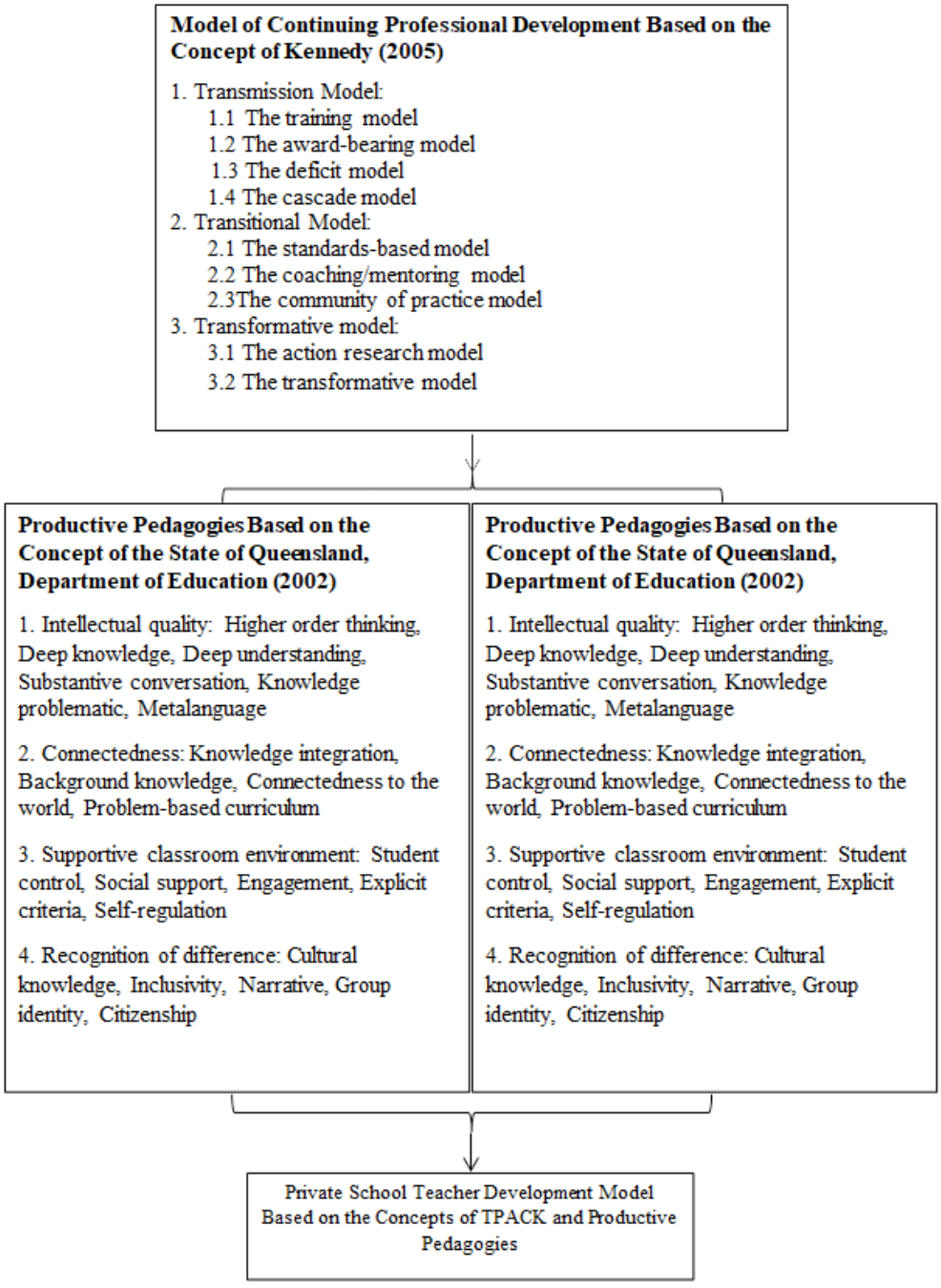

Figure 5 Conceptual Framework (Final)

4.2 Current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies

4.2.1 Informants' Background

Table 11 Numbers and Percentages of Sent and Returned Questionnaires from Schools under the Office of Private Education Commission

No.	Region	School	Percentage	Urban	Percentage	Rural	Percentage	Total Percentage	Number of Questionnaires (352 Schools)	Informants (2 people from each school)
Sent Questionnaires										
1	Central	1,423	37.00	1,159	82.00	264	18.00	100.00	130	260
2	East	236	6.00	78	33.00	158	67.00	100.00	22	44
3	Northeast	831	21.00	258	31.00	573	69.00	100.00	76	152
4	North	335	9.00	126	38.00	209	62.00	100.00	31	62
5	West	136	4.00	49	36.00	87	64.00	100.00	12	24
6	South	889	23.00	225	25.00	664	75.00	100.00	81	162
Total		3,850	100.00	1,895	49.00	1,955	51.00	100.00	352	704
Returned Questionnaires								46.00	163	326

Table 11 shows the numbers of sent and returned questionnaires by regions, then broken down into urban and rural parts in each region. The questionnaires were mostly from 130 schools in the Central region, followed by the 81 schools in the Southern region, and 76 schools in the Northeastern region. However, due to some limitations, this study only has 46% of the number of returned questionnaires.

Table 12 General Information of School

School Background Information / Size		Small	Medium	Large	Extra Large	Total	Percentage
Geographical Location	Central	5	27	25	19	76	46.60
	North	1	9	8	2	20	12.30
	North East	1	14	9	5	29	17.80
	South	3	13	16	6	38	23.30
Total		10	63	58	32	163	100.00

Table 12 General Information of School (continued)

School Background Information / Size		Small	Medium	Large	Extra Large	Total	Percentage
Educational Levels	PreK-Primary6	2	10	7	1	21	12.90
	Kindergarten1-Primary6	6	38	15	3	62	38.00
	PreK-Secondary3	-	4	5	2	11	6.70
	Kindergarten1-Secondary3	-	3	11	6	20	12.30
	Kindergarten1-Secondary6	-	7	17	19	43	26.40
	Primary1-Secondary6	1	1	3	1	6	3.70
Total Number of Schools		9	63	58	32	163	100.00

Table 12 shows the number of schools classified by school size, geographical location, and educational levels. Looking at the geographical aspect, we can see that schools were mostly from central region (46.60%) and southern area (23.30%). While the educational levels show that the majority of the schools offer education from Kindergarten 1 to Primary 6 (38.00%), followed by Kindergarten 1 to Secondary 6 (26.40%). The schools were mostly medium-sized with 121-600 children under attendance (63 schools) followed by large schools with 601-1,500 children under attendance (58 schools).

Table 13 General Information of Informants

Informants' Background Information		School Administrators						Total (N:326)	Percentage
		School Director	School Principal	School Manager	Vice Principal	Head of Department	Teacher		
Gender	Female	4	68	6	32	33	100	243	74.50
	Male	4	38	3	16	4	18	83	25.50
Age	< 25 yrs.	0	0	0	0	0	7	7	2.10
	26-30 yrs.	0	1	1	0	5	20	27	8.30
	31-35 yrs.	0	1	0	6	9	13	29	8.90
	36-40 yrs.	0	5	0	6	9	16	36	11.00
	41-45 yrs.	1	13	1	12	5	21	53	16.30
	>46 yrs.	7	86	7	24	14	36	174	53.40

Table 13 General Information of Informants (continued)

Informants' Background Information		School Administrators					Teacher	Total (N:326)	Percentage
		School Director	School Principal	School Manager	Vice Principal	Head of Department			
Highest Educational Attainment	Bachelor's Degree	3	16	1	10	29	83	142	43.60
	Graduate Diploma	1	0	1	5	2	5	14	4.30
	Master's Degree	4	68	6	25	9	16	128	39.30
	Doctoral Degree	0	15	1	4	0	0	20	6.10
	Not Specified	0	8	0	4	2	8	22	6.70
Work Experience	<6 mos.	0	0	0	0	1	3	4	1.20
	6 mos.- 1 yr.	1	0	0	0	0	6	7	2.10
	1-2 yrs.		2		1	1	12	16	4.90
	2-5 yrs.	1	7	1	3	2	15	29	8.90
	5-10 yrs.	0	12	1	6	15	22	56	17.20
	>10 yrs.	6	85	7	38	23	55	214	65.60

Table 13 shows the numbers of informants including 8 school directors, 106 school principals, 9 school managers, 48 vice principals, 37 heads of department, and 118 teachers, a total of 326 informants. The dominant informants were female, mostly aged over 46 years, making a percentage of 53.40, and 41-45 years, making a percentage of 16.30. Out of all the respondents, 43.60% attained a bachelor's degree and 39.30% attained a master's degree. Most of them have had more than 10 years of work experience in private schools, making a percentage of 65.60, followed by 5-10 years, making a percentage of 17.20.

Table 14 Numbers of out-of-field teachers and in-field teachers

Teachers	Number of Teachers	Total Percentage
Non-educational degree teachers	1,584	26.30
Out-of-Field teaching teachers	1,165	19.40
Total Out-of-Field teachers	2,749	45.70
Total In-Field and Educational degree teachers	3,263	54.30
Total number of teachers	6,012	100.00

Table 14 shows the numbers of in-field teachers and out-of-field teachers. From the table we can see that non-educational degree teachers' number accumulates to

1,584 teachers or 26.30% of the total number of teachers. Out-of-field teaching teachers' number accumulates to 1,165 teachers, making 19.40% ; the total number of both is 2,749 teachers, making 45.70% . On the other hand, in-field and educational degree teachers' number accumulates to 3,263 teachers, making 54.30%.

Table 15 A comparison of out-of-field teachers and in-field teachers with school sizes

Teachers	School sizes								Number of Teachers
	Small	Percentage	Medium	Percentage	Large	Percentage	Extra large	Percentage	
Non-educational degree teachers	45	58.40	335	29.90	668	29.10	536	21.30	1,584
Out-of-Field teaching teachers	17	22.10	293	26.10	402	17.50	453	18.00	1,165
Total out-of-field teachers	62	80.50	628	56.00	1,070	46.60	989	39.30	2,749
Total In-field and Educational degree teachers	15	19.50	493	44.00	1,226	53.40	1,529	60.70	3,263
Total number of teachers	77	100.00	1,121	100.00	2,296	100.00	2,518	100.00	6,012

Table 15 compares the numbers of out-of-field teachers, in-field teachers and school sizes. From the table, we found that large schools have the most out-of- field teachers of 1,070, followed by extra-large schools with 989 out-of-field teachers, medium-sized school with 628 out-of-field teachers, and small schools with 62 out-of-field teachers.

While looking at the percentages of out-of-field teachers of each school size as compared to the in-field teachers, we found that small schools have the highest percentage of out-of-field teachers (80.5%), followed by medium-sized schools (56.00%), large schools (46.60%), and extra large schools (39.30%) respectively.

Table 16 A comparison of out-of-field teachers and in-field teachers with geographical location

Teachers	Geographical location								Total number of teachers
	Central	Percentage	North	Percentage	Northeast	Percentage	South	Percentage	
Non-educational degree teachers	804	29.30	136	15.40	260	30.20	384	25.20	1584
Out-of-field teaching teachers	504	18.40	149	16.90	114	13.20	398	26.10	1165
Total Out-of-field teachers	1,308	47.60	285	32.30	374	43.40	782	51.40	2749
In-field and Educational degree teachers	1,438	52.40	597	67.70	488	56.60	740	48.60	3263
Total number of teachers	2,746	100.00	882	100.00	862	100.00	1,522	100.00	6012

Table 16 compares the numbers of out-of-field teachers, in-field teachers and geographical locations. From the table, we found that central area has the highest number of out-of-field teachers, that is 1,308, followed by southern area with 782 out-of-field teachers, northeastern area with 374 out-of-field teachers, and northern area with 285 out-of-field teachers.

While looking at the percentage of out-of-field teachers as compared to the total number of teachers in each area, we found that southern area has the highest percentage of out-of-field teachers, 51.40, followed by central area, 47.60, northeastern area, 43.40, and northern area, 32.30.

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Table 17 A comparison of out-of-field teachers and in-field teachers with educational levels

Teachers	Educational levels												Total number of teachers
	PreK-P.6	Percentage	K.1-P.6	Percentage	PreK-S.3	Percentage	K.1-S.3	Percentage	K.1-S.6	Percentage	P.1-S.6	Percentage	
Non-educational degree teachers	250	40.06	431	28.97	57	19.52	313	28.45	536	22.83	12	7.50	1,599
Out-of-field teaching teachers	205	32.85	416	27.96	58	19.86	184	16.73	278	11.84	9	5.63	1,150
Total Out-of-field teachers	455	72.92	847	56.92	115	39.38	497	45.18	814	34.67	21	13.13	2,749
In-field and Educational degree teachers	169	27.08	641	43.08	177	60.62	603	54.82	1,534	65.33	139	86.88	3,263
Total number of teachers	624	100.00	1,488	100.00	292	100.00	1,100	100.00	2,348	100.00	160	100.00	6,012

Table 17 compares the numbers of out-of-field teachers, in-field teachers and educational levels. From the table, we found that kindergarten 1 to primary 6 has the highest number of out-of-field teachers 847, followed by kindergarten 1 to secondary 6 with 814 out-of-field teachers, kindergarten 1 to secondary 3 with 497 out-of-field teachers, pre-kindergarten to primary 6 with 455 out-of-field teachers, pre-kindergarten to secondary 3 with 115 out-of-field teachers, and primary 1 to secondary 6 with 21 out- of-field teachers.

While looking at the percentage of out-of-field teachers as compared to the total number of teachers in each educational level, we found that pre-kindergarten to primary 6 has the highest percentage of out-of-field teachers, 72.92, followed by kindergarten to primary 6 at 56.92 percent, kindergarten 1 to secondary 3 at 45.18 percent, pre-kindergarten to secondary 3 at 39.38 percent, kindergarten 1 to secondary 6 at 34.67 percent, and primary 1 to secondary 6 at 13.13 percent.

CHULALONGKORN UNIVERSITY

Table 18 A comparison of out-of-field teaching subjects and school sizes

Subjects	School sizes				Total	Rank
	Small	Medium	Large	Extra large		
1. Primary Education	-	2	2	-	**4**	9
2. Physics	-	2	-	-	**2**	10
3. Thai Language	2	12	12	4	**30**	2
4. Mathematics	4	17	14	7	**42**	1
5. Social Studies, Religion and Culture	-	6	9	6	**21**	3
6. Science	2	2	4	-	**8**	7
7. Computer	-	4	-	2	**6**	8
8. Early Childhood	-	6	3	5	**14**	5
9. English	2	7	9	2	**20**	4
10. Occupation and Technology	-	2	4	4	**10**	6
11. Art	-	4	-	-	**4**	9
12. Guidance	-	-	2	-	**2**	10
Total	**10**	**64**	**59**	**30**	**163**	

Table 18 compares the numbers of out-of-field teaching subjects and school sizes. From the table, we found that Mathematics has the most out-of-field teachers teaching the subjects, followed by Thai language, Social studies, Religion and Culture, and English. When looking at the school sizes, we found that medium-sized schools have the most out-of-field teachers teaching the subjects, followed by large, extra large, and small schools.

Table 19 A comparison of out-of-field teaching levels and school sizes

Teaching levels	School Sizes				Total number of teachers	Percentage
	Small	Medium	Large	Extra Large		
K.1-K.3	4	6	4	5	19	11.70
K.1-P.6	-	7	8	6	21	12.90
K.1-S.3	-	-	6	-	6	3.70
K.1-S.6	-	-	-	4	4	2.50
P.1-P.6	7	36	27	7	77	47.20
P.1-S.6	-	8	10	10	28	17.20
S.1-S.3	-	4	-	4	8	4.90
Total number of teachers	11	61	55	36	163	100.00

Table 19 compares the numbers of out-of-field teaching levels and school sizes. From the table, we found that most out-of-field teachers teach primary 1 to 6 in medium-sized schools, followed by primary 1 to 6 in large schools. The majority of out-of-field teachers are in medium-sized schools and teach primary 1 to 6, making a percentage of 47.20.

4.2.2 Current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies

The tables below present the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies.

Table 20 The overall current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in different development models aspect

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
Development Models								
1. Transmission Model	**4.12**	**0.85**	**High**	**1**	**3.65**	**0.88**	**High**	**1**
1.1 The Training Model	4.11	0.86	High	3	3.70	0.88	High	1
1.2 The Award-bearing Model	4.10	0.86	High	4	3.64	0.89	High	3
1.3 The Deficit Model	4.09	0.85	High	5	3.61	0.86	High	5
1.4 The Cascade Model	4.13	0.85	High	2	3.62	0.87	High	4
1.5 The Standard-based Model	4.19	0.83	High	1	3.67	0.89	High	2
2. Transitional Model	**4.08**	**0.87**	**High**	**3**	**3.53**	**0.90**	**High**	**2**
2.1 The Coaching/Mentoring Model	4.10	0.86	High	1	3.59	0.90	High	1
2.2 The Community of Practice Model	4.06	0.87	High	2	3.48	0.89	Moderate	2
3. Transformative Model	**4.09**	**0.87**	**High**	**2**	**3.51**	**0.91**	**High**	**3**
3.1 The Action Research Model	4.07	0.87	High	2	3.44	0.92	Moderate	2
3.2 The Transformative Model	4.11	0.87	High	1	3.58	0.90	High	1
Overall	**4.11**	**0.86**	**High**		**3.59**	**0.89**	High	

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Table 20 shows the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in different development models aspect. The mean of the current states is at a high level ($\bar{X}$= 3.59, S.D. = 0.89), and the mean of the desirable states is also at a high level ($\bar{X}$= 4.11, S.D. = 0.86).

With respect to the current states, the findings suggest a high level of transmission model in developing teachers on technological pedagogical content knowledge and productive pedagogies with the mean at a high level ($\bar{X}$= 3.65, S.D. = 0.88). When considering each model in the transmission model, we found that the training model has the highest mean at a high level ($\bar{X}$= 3.70, S.D. = 0.88), followed by the standard-based model with the mean also at a high level ($\bar{X}$= 3.67, S.D. = 0.89).

Next, the findings suggest a high level of the transitional model in developing teachers on technological pedagogical content knowledge and productive pedagogies, which ranks second with the mean at a high level ($\bar{X}$= 3.53, S.D. = 0.90).

When considering each item in transitional model we found that the coaching and mentoring model has the highest mean at a high level ($\bar{X}$ = 3.59, S.D. = 0.90), followed by the community of practice model with the mean at a high level ($\bar{X}$= 3.48, S.D. = 0.89).

Lastly, the lowest ranking among all the models is the transformative model. However, the findings suggest a high level of the transformative model in developing teachers on technological pedagogical content knowledge and productive pedagogies with the mean at a high level ($\bar{X}$= 3.51, S.D. = 0.91). When considering each item in transformative model, we found that the transformative model has the highest mean at a high level ($\bar{X}$= 3.58, S.D. = 0.90), followed by the action research model with the mean at a high level ($\bar{X}$= 3.44, S.D. = 0.92).

For the desirable states, the findings suggest a high level of transmission model in developing teachers on technological pedagogical content knowledge and productive pedagogies; this model ranks first with the mean at a high level ($\bar{X}$= 4.12, S.D. = 0.85). When considering each item in the transmission model, we found that the standard-based model has the highest mean at a high level ($\bar{X}$= 4.19, S.D. = 0.83), followed by the cascade model with the mean at a high level ($\bar{X}$= 4.13, S.D. = 0.85).

Next, the findings suggest a high level of transformative model in developing teachers on technological pedagogical content knowledge and productive pedagogies; this model ranks second with the mean at a high level ($\bar{X}$= 4.09, S.D. = 0.87). When considering each item in transformative model, we found that the transformative model has the highest mean at a high level ($\bar{X}$= 4.11, S.D. = 0.87), followed by the action research model with the mean at a high level ($\bar{X}$ = 4.07, S.D. = 0.87).

Last is the lowest ranking among all the models, the findings, however, suggest a high level of transitional model in developing teachers on technological pedagogical content knowledge and productive pedagogies with the mean at a high level ($\bar{X}$= 4.08, S.D. = 0.87). When considering each item in the transitional model, we found that the coaching and mentoring model has the highest mean at a high level ($\bar{X}$= 4.10, S.D. = 0.86), followed by the community of practice model with the mean at a high level ($\bar{X}$ = 4.06, S.D. = 0.87).

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Table 21 The overall current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in productive pedagogies aspect

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
Productive Pedagogies								
Intellectual Quality	**4.00**	**0.89**	**High**	**4**	**3.47**	**0.92**	**Moderate**	**4**
Higher order thinking	3.99	0.89	High	2	3.50	0.92	High	2
Deep knowledge	3.99	0.89	High	2	3.44	0.89	High	3
Deep understanding	4.04	0.88	High	1	3.54	0.90	High	1
Substantive conversation	4.04	0.88	High	1	3.54	0.90	High	1
Knowledge problematic	3.98	0.93	High	3	3.45	0.93	Moderate	4
Metalanguage	3.99	0.91	High	2	3.37	0.95	Moderate	5
Connectedness	**4.13**	**0.83**	**High**	**2**	**3.64**	**0.88**	**High**	**2**
Knowledge integration	4.13	0.83	High	2	3.69	0.88	High	2
Background knowledge	4.17	0.83	High	1	3.70	0.86	High	1
Connectedness to the world	4.12	0.83	High	3	3.60	0.88	High	3
Problem-based curriculum	4.10	0.86	High	4	3.57	0.90	High	4
Supportive Classroom Environment	**4.10**	**0.85**	**High**	**3**	**3.59**	**0.90**	**High**	**3**
Student control	4.05	0.89	High	4	3.54	0.95	High	4
Social support	4.13	0.83	High	1	3.65	0.88	High	1
Engagement	4.10	0.85	High	3	3.56	0.91	High	3
Explicit criteria	4.13	0.85	High	1	3.64	0.88	High	2
Self-regulation	4.11	0.86	High	2	3.56	0.88	High	3
Recognition of Difference	**4.14**	**0.85**	**High**	**1**	**3.65**	**0.88**	**High**	**1**
Cultural knowledge	4.14	0.84	High	2	3.70	0.90	High	3
Inclusivity	4.18	0.85	High	1	3.73	0.88	High	1
Narrative	4.12	0.85	High	3	3.60	0.88	High	4
Group identity	4.08	0.87	High	4	3.54	0.88	High	5
Citizenship	4.18	0.85	High	1	3.71	0.89	High	2
Overall	**4.09**	**0.86**	**High**		**3.59**	**0.90**	**High**	

Table 21 shows the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in productive pedagogies aspect. The mean of the current states is at a high level ($\bar{X}$= 3.59, S.D. = 0.90), and the mean of the desirable states is also at a high level ($\bar{X}$= 4.09, S.D. = 0.86).

With respect to the current states, the findings suggest a high level of the teacher development model in developing teachers on productive pedagogies in recognition of difference aspect, which ranks first with the mean at a high level ($\bar{X}$= 3.65, S.D. = 0.88). When considering each item in recognition of difference aspect we found that inclusivity has the highest mean at a high level ($\bar{X}$= 3.73, S.D. = 0.88), followed by citizenship with the mean at a high level ($\bar{X}$= 3.71, S.D. = 0.89).

Next, the findings also suggest a high level of teacher development model in developing teachers on productive pedagogies in connectedness aspect, which ranks second with the mean at a high level ($\bar{X}$= 3.64, S.D. = 0.88). When considering each item in the connectedness aspect, we found that background knowledge has the highest mean at a high level ($\bar{X}$= 3.70, S.D. = 0.86), followed by knowledge integration with the mean at a high level ($\bar{X}$= 3.69, S.D. = 0.88).

Lastly, as for the lowest ranking among all aspects, the finding suggests moderate level of teacher development model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a moderate level ($\bar{X}$= 3.47, S.D. = 0.92). When considering each item in intellectual quality aspect, we found that substantive conversation has the highest mean at a high level ($\bar{X}$= 3.54, S.D. = 0.90) as well as deep understanding ($\bar{X}$= 3.54, S.D. = 0.90), followed by higher order thinking with the mean at a high level ($\bar{X}$= 3.50, S.D. = 0.92).

For the desirable states, the findings suggest a high level of teacher development model in developing teachers on productive pedagogies in recognition of difference aspect, which ranks first with the mean at a high level ($\bar{X}$= 4.14, S.D. = 0.85). When considering each item in recognition of difference aspect, we found that inclusivity has the highest mean at a high level ($\bar{X}$= 4.18, S.D. = 0.85) as well as citizenship ($\bar{X}$= 4.18, S.D. = 0.85), followed by cultural knowledge with the mean at a high level ($\bar{X}$= 4.14, S.D. = 0.84).

Next, the findings also suggest a high level of the teacher development model in developing teachers on productive pedagogies in connectedness aspect, which ranks second with the mean at a high level ($\bar{X}$= 4.13, S.D. = 0.83). When considering each item in connectedness aspect, we found that background knowledge has the highest mean at a high level ($\bar{X}$= 4.17, S.D. = 0.83), followed by connectedness to the world with the mean at a high level ($\bar{X}$= 4.12, S.D. = 0.83).

Lastly, as for the lowest ranking among all aspects, the finding suggests a high level of the teacher development model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a high level ($\bar{X}$= 4.00, S.D. = 0.89). When considering each item in intellectual quality aspect, we found that substantive conversation and deep understanding have the highest mean at a high level ($\bar{X}$ = 4.04, S.D. = 0.88), followed by higher order thinking and deep knowledge, with the mean at a high level ($\bar{X}$ = 3.99, S.D. = 0.89), followed by metalanguage ($\bar{X}$= 3.99, S.D. = 0.91).

Table 22 The overall current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in technological pedagogical content knowledge

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
Technological Pedagogical Content Knowledge								
1. Content knowledge	4.17	0.89	High	1	3.71	0.86	High	1
2. Pedagogical knowledge	4.17	0.84	High	1	3.68	0.84	High	2
3. Technological knowledge	4.17	0.85	High	1	3.65	0.88	High	3
4. Pedagogical content knowledge	4.16	0.86	High	2	3.63	0.88	High	4
5. Technological content knowledge	4.15	0.86	High	3	3.59	0.88	High	5
6. Technological pedagogical knowledge	4.15	0.85	High	3	3.59	0.88	High	5
7. Technological pedagogical content knowledge	4.15	0.86	High	3	3.58	0.89	High	6
Overall	**4.16**	**0.86**	**High**		**3.63**	**0.87**	**High**	

Table 22 shows the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in technological pedagogical content knowledge aspect. The mean of the current states is at a high level ($\bar{X}$ = 3.63, S.D. = 0.87), and the mean of the desirable states is at a high level ($\bar{X}$= 4.16, S.D. = 0.86).

With respect to the current states, the findings suggest a high level of teacher development model in developing teachers on technological pedagogical content knowledge in content knowledge, which ranks first with the mean at a high level ($\bar{X}$= 3.71, S.D. = 0.86), followed by pedagogical knowledge with the mean at a high level ($\bar{X}$= 3.68, S.D. = 0.84). Lastly, the lowest ranking among all aspects is technological pedagogical content knowledge with the mean at a high level ($\bar{X}$= 3.58, S.D. = 0.89).

For the desirable states, the findings suggest a high level of teacher development model in developing teachers on technological pedagogical content knowledge in content knowledge, which ranks first with the mean at a high level ($\bar{X}$= 4.17, S.D. = 0.89) as well as pedagogical knowledge ($\bar{X}$= 4.17, S.D. = 0.84) and technological knowledge ($\bar{X}$= 4.17, S.D. = 0.85), followed by pedagogical content knowledge ($\bar{X}$= 4.16, S.D. = 0.86). The lowest rankings are technological content knowledge with the mean at a high level ($\bar{X}$= 4.15, S.D. = 0.86), technological pedagogical knowledge with the mean at a high level ($\bar{X}$ = 4.15, S.D. = 0.85), and technological pedagogical content knowledge with the mean at a high level ($\bar{X}$ = 4.15, S.D. = 0.86).

Table 23 Current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in transmission model by the training model

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
1. The school uses the training model in developing teachers on productive pedagogies in intellectual quality aspect as follows:	3.88	0.95	High	5	3.43	0.92	Moderate	5
1.1 Higher order thinking	3.88	0.92	High	2	3.54	0.95	High	2
1.2 Deep knowledge	3.84	0.98	High	4	3.38	0.86	Moderate	4
1.3 Deep understanding	3.86	0.95	High	3	3.36	0.89	Moderate	5
1.4 Substantive conversation	3.98	0.94	High	1	3.66	0.89	High	1
1.5 Knowledge problematic	3.88	1.00	High	2	3.41	0.98	Moderate	3
1.6 Metalanguage	3.88	0.95	High	2	3.23	0.98	Moderate	6
2. The school uses the training model in developing teachers on productive pedagogies in connectedness aspect as follows:	4.14	0.84	High	3	3.78	0.89	High	3
2.1 Knowledge integration	4.16	0.87	High	2	3.94	0.88	High	1
2.2 Background knowledge	4.22	0.83	High	1	3.88	0.87	High	2
2.3 Connectedness to the world	4.12	0.83	High	3	3.65	0.89	High	3
2.4 Problem-based curriculum	4.09	0.84	High	4	3.65	0.92	High	3
3. The school uses the training model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	4.11	0.86	High	4	3.66	0.94	High	4
3.1 Student control	4.03	0.94	High	5	3.52	1.05	High	5
3.2 Social support	4.15	0.84	High	2	3.75	0.94	High	2
3.3 Engagement	4.08	0.84	High	4	3.59	0.99	High	4
3.4 Explicit criteria	4.16	0.86	High	1	3.78	0.84	High	1
3.5 Self-regulation	4.13	0.86	High	3	3.67	0.90	High	3
4. The school uses the training model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	4.18	0.83	High	2	3.82	0.83	High	1
4.1 Cultural knowledge	4.20	0.81	High	3	3.83	0.85	High	3
4.2 Inclusivity	4.27	0.81	High	1	3.99	0.81	High	1
4.3 Narrative	4.13	0.81	High	4	3.77	0.81	High	4
4.4 Group identity	4.06	0.89	High	5	3.64	0.84	High	5
4.5 Citizenship	4.24	0.84	High	2	3.91	0.85	High	2

Table 23 Current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in transmission model by the training model (continued)

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
5. The school uses the training model in developing teachers on technological pedagogical content knowledge as follows:	4.24	0.83	High	1	3.81	0.84	High	2
5.1 Content knowledge	4.26	0.82	High	2	3.94	0.82	High	1
5.2 Pedagogical knowledge	4.24	0.82	High	4	3.88	0.80	High	2
5.3 Technological knowledge	4.27	0.82	High	1	3.84	0.86	High	3
5.4 Pedagogical content knowledge	4.24	0.85	High	4	3.83	0.82	High	4
5.5 Technological content knowledge	4.23	0.84	High	5	3.75	0.86	High	5
5.6 Technological pedagogical knowledge	4.25	0.84	High	3	3.74	0.87	High	6
5.7 Technological pedagogical content knowledge	4.21	0.84	High	6	3.73	0.86	High	7
Overall	4.11	0.86	High		3.70	0.88	High	

Table 23 presents the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in transmission model by the training model. The findings show the mean of the current states at a high level ($\bar{X}$ = 3.70, S.D. = 0.88), and the mean of the desirable states at a high level ($\bar{X}$ = 4.11, S.D. = 0.86).

With respect to the current states, the findings suggest a high level of the training model in developing teachers on productive pedagogies in recognition of difference aspect, which ranks first with the mean at a high level ($\bar{X}$ = 3.82, S.D. = 0.83). When considering each item in recognition of difference aspect, we found that inclusivity has the highest mean at a high level ($\bar{X}$ = 3.99, S.D. = 0.81), followed by citizenship with the mean at a high level ($\bar{X}$ = 3.91, S.D. = 0.85).

Next, the findings also suggest a high level of the training model in developing teachers on technological pedagogical content knowledge, which ranks second with the mean at a high level ($\bar{X}$ = 3.81, S.D. = 0.84). When considering each item in technological pedagogical content knowledge, we found that content knowledge has the highest mean at a high level ($\bar{X}$ = 3.94, S.D. = 0.82), followed by pedagogical knowledge with the mean at a high level ($\bar{X}$ = 3.88, S.D. = 0.80).

Lastly, as for the lowest ranking among all aspects, the findings suggest a moderate level of the training model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a moderate level ($\bar{X}$ = 3.43, S.D. = 0.92). When considering each item in intellectual quality aspect, we found that substantive

conversation has the highest mean at a high level ($\bar{X}$ = 3.66, S.D. = 0.89), followed by higher order thinking with the mean at a high level ($\bar{X}$ = 3.54, S.D. = 0.95).

For the desirable states, the findings suggest a high level of the training model in developing teachers on technological pedagogical content knowledge, which ranks first with the mean at a high level ($\bar{X}$ = 4.24, S.D. = 0.83). When considering each item in technological pedagogical content knowledge, we found that technological knowledge has the highest mean at a high level ($\bar{X}$ = 4.27, S.D. = 0.82), followed by content knowledge with the mean at a high level ($\bar{X}$ = 4.26, S.D. = 0.82).

Next, the findings also suggest a high level of the training model in developing teachers on productive pedagogies in recognition of difference aspect, which ranks second with the mean at a high level ($\bar{X}$ = 4.18, S.D. = 0.83). When considering each item in recognition of difference aspect, we found that inclusivity has the highest mean at a high level ($\bar{X}$ = 4.27, S.D. = 0.81), followed by citizenship with the mean at a high level ($\bar{X}$ = 4.24, S.D. = 0.84).

Lastly, as for the lowest ranking among all aspects, the findings suggest a high level of the training model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a high level ($\bar{X}$ = 3.88, S.D. = 0.95). When considering each item in intellectual quality aspect, we found that substantive conversation has the highest mean at a high level ($\bar{X}$ = 3.98, S.D. = 0.94), followed by higher order thinking, with the mean at a high level ($\bar{X}$ = 3.88, S.D. = 0.92), metalanguage ($\bar{X}$ = 3.88, S.D. = 0.95), and knowledge problematic ($\bar{X}$ = 3.88, S.D. = 1.00).

Table 24 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transmission model by the award-bearing model

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
6. The school uses the award-bearing model in developing teachers on productive pedagogies in intellectual quality aspect as follows:	3.99	0.90	High	5	3.45	0.93	Moderate	5
6.1 Higher order thinking	4.02	0.89	High	2	3.52	0.99	High	2
6.2 Deep knowledge	3.96	0.90	High	5	3.45	0.94	Moderate	3
6.3 Deep understanding	3.97	0.90	High	4	3.41	0.91	Moderate	5
6.4 Substantive conversation	4.07	0.90	High	1	3.54	0.94	High	1
6.5 Knowledge problematic	3.95	0.95	High	6	3.43	0.90	Moderate	4
6.6 Metalanguage	4.00	0.89	High	3	3.38	0.95	Moderate	6

Table 24 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transmission model by the award-bearing model (continued)

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
7. The school uses the award-bearing model in developing teachers on productive pedagogies in connectedness aspect as follows:	4.14	0.83	High	3	3.70	0.90	High	3
7.1 Knowledge integration	4.15	0.81	High	2	3.77	0.91	High	1
7.2 Background knowledge	4.16	0.84	High	1	3.76	0.86	High	2
7.3 Connectedness to the world	4.15	0.83	High	2	3.69	0.92	High	3
7.4 Problem-based curriculum	4.13	0.87	High	3	3.61	0.93	High	4
8. The school uses the award-bearing model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	4.07	0.89	High	4	3.62	0.88	High	4
8.1 Student control	3.99	0.91	High	4	3.54	0.89	High	5
8.2 Social support	4.12	0.84	High	1	3.69	0.87	High	1
8.3 Engagement	4.07	0.89	High	3	3.57	0.91	High	4
8.4 Explicit criteria	4.10	0.90	High	2	3.68	0.87	High	2
8.5 Self-regulation	4.07	0.91	High	3	3.64	0.86	High	3
9. The school uses the award-bearing model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	4.15	0.85	High	2	3.71	0.89	High	2
9.1 Cultural knowledge	4.18	0.83	High	3	3.76	0.92	High	3
9.2 Inclusivity	4.21	0.87	High	2	3.81	0.92	High	1
9.3 Narrative	4.12	0.82	High	4	3.65	0.89	High	4
9.4 Group identity	4.03	0.92	High	5	3.57	0.87	High	5
9.5 Citizenship	4.23	0.83	High	1	3.80	0.89	High	2

Table 24 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transmission model by the award-bearing model (continued)

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
10. The school uses the award-bearing model in developing teachers on technological pedagogical content knowledge as follows:	4.19	0.83	High	1	3.74	0.86	High	1
10.1 Content knowledge	4.17	0.84	High	5	3.81	0.85	High	1
10.2 Pedagogical knowledge	4.22	0.82	High	2	3.76	0.81	High	3
10.3 Technological knowledge	4.23	0.80	High	1	3.77	0.85	High	2
10.4 Pedagogical content knowledge	4.16	0.84	High	6	3.73	0.87	High	5
10.5 Technological content knowledge	4.20	0.84	High	3	3.74	0.87	High	4
10.6 Technological pedagogical knowledge	4.19	0.86	High	4	3.68	0.90	High	7
10.7 Technological pedagogical content knowledge	4.22	0.83	High	2	3.69	0.88	High	6
Overall	4.11	0.86	High		3.64	0.86	High	

Table 24 presents the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in transmission model by the award-bearing model. The findings show the mean of the current states at a high level ($\bar{X}$ = 3.64, S.D. = 0.86), and the mean of the desirable states at a high level ($\bar{X}$ = 4.11, S.D. = 0.86).

With respect to the current states, the findings suggest a high level of the award-bearing model in developing teachers on technological pedagogical content knowledge, which ranks first with the mean at a high level ($\bar{X}$ = 3.74, S.D. = 0.86). When considering each item in technological pedagogical content knowledge, we found that content knowledge has the highest mean at a high level ($\bar{X}$ = 3.81, S.D. = 0.85), followed by technological knowledge with the mean at a high level ($\bar{X}$ = 3.77, S.D. = 0.85).

Next, the findings suggest a high level of the award-bearing model in developing teachers on productive pedagogies in recognition of difference aspect, which ranks second with the mean at a high level ($\bar{X}$ = 3.71, S.D. = 0.89). When considering each item in recognition of difference aspect, we found that inclusivity has the highest mean at a high level ($\bar{X}$ = 3.81, S.D. = 0.92), followed by citizenship with the mean at a high level ($\bar{X}$ = 3.80, S.D. = 0.89).

Lastly, as for the lowest ranking among all aspects, the findings suggest moderate level of the award-bearing model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a moderate level ($\bar{X}$ = 3.45, S.D. = 0.93). When considering each item in intellectual quality aspect, we found that substantive conversation has the highest mean at a high level ($\bar{X}$ = 3.54, S.D. = 0.94), followed by higher order thinking with the mean at a high level ($\bar{X}$ = 3.52, S.D. = 0.99).

For the desirable states, the findings suggest a high level of the award-bearing model in developing teachers on technological pedagogical content knowledge, which ranks first with the mean at a high level ($\bar{X}$ = 4.19, S.D. = 0.83). When considering each item in technological pedagogical content knowledge, we found that technological knowledge has the highest mean at a high level ($\bar{X}$ = 4.23, S.D. = 0.80), followed by pedagogical knowledge with the mean at a high level ($\bar{X}$ = 4.22, S.D. = 0.82).

Next, the findings suggest a high level of the award-bearing model in developing teachers on productive pedagogies in recognition of difference aspect, which ranks second with the mean at a high level ($\bar{X}$ = 4.15, S.D. = 0.85). When considering each item in recognition of difference aspect, we found that citizenship has the highest mean at a high level ($\bar{X}$ = 4.23, S.D. = 0.83), followed by inclusivity with the mean at a high level ($\bar{X}$ = 4.21, S.D. = 0.87).

Lastly, as for the lowest ranking among all aspects, the findings suggest a high level of the award-bearing model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a high level ($\bar{X}$ = 3.99, S.D. = 0.90). When considering each item in intellectual quality aspect, we found that substantive conversation has the highest mean at a high level ($\bar{X}$ = 4.07, S.D. = 0.90), followed by higher order thinking with the mean at a high level ($\bar{X}$ = 4.02, S.D. = 0.89).

Table 25 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transmission model by the deficit model

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
11. The school uses the deficit model in developing teachers on productive pedagogies in intellectual quality aspect as follows:	3.99	0.90	High	5	3.49	0.89	Moderate	5
11.1 Higher order thinking	3.99	0.92	High	3	3.54	0.92	High	2
11.2 Deep knowledge	4.00	0.88	High	2	3.48	0.89	Moderate	4
11.3 Deep understanding	3.98	0.88	High	4	3.45	0.90	Moderate	5
11.4 Substantive conversation	4.05	0.88	High	1	3.63	0.84	High	1
11.5 Knowledge problematic	3.95	0.93	High	6	3.49	0.90	Moderate	3
11.6 Metalanguage	3.97	0.92	High	5	3.39	0.94	Moderate	6

Table 25 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transmission model by the deficit model (continued)

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
12. The school uses the deficit model in developing teachers on productive pedagogies in connectedness aspect as follows:	4.10	0.83	High	3	3.63	0.87	High	3
12.1 Knowledge integration	4.13	0.80	High	1	3.69	0.89	High	2
12.2 Background knowledge	4.13	0.85	High	1	3.73	0.83	High	1
12.3 Connectedness to the world	4.07	0.82	High	3	3.57	0.88	High	3
12.4 Problem-based curriculum	4.10	0.85	High	2	3.53	0.88	High	4
13. The school uses the deficit model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	4.09	0.85	High	4	3.62	0.88	High	4
13.1 Student control	4.03	0.92	High	5	3.53	0.96	High	5
13.2 Social support	4.11	0.82	High	2	3.67	0.89	High	2
13.3 Engagement	4.10	0.86	High	3	3.61	0.89	High	3
13.4 Explicit criteria	4.15	0.84	High	1	3.71	0.85	High	1
13.5 Self-regulation	4.09	0.85	High	4	3.60	0.84	High	4
14. The school uses the deficit model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	4.11	0.83	High	2	3.67	0.84	High	1
14.1 Cultural knowledge	4.11	0.84	High	3	3.72	0.85	High	3
14.2 Inclusivity	4.12	0.83	High	2	3.74	0.81	High	2
14.3 Narrative	4.08	0.83	High	4	3.65	0.84	High	4
14.4 Group identity	4.07	0.87	High	5	3.52	0.87	High	5
14.5 Citizenship	4.17	0.82	High	1	3.76	0.85	High	1
15. The school uses the deficit model in developing teachers on technological pedagogical content knowledge as follows:	4.14	0.84	High	1	3.66	0.81	High	2
15.1 Content knowledge	4.15	0.80	High	1	3.75	0.79	High	1
15.2 Pedagogical knowledge	4.12	0.81	High	4	3.70	0.83	High	3
15.3 Technological knowledge	4.14	0.87	High	2	3.72	0.79	High	2
15.4 Pedagogical content knowledge	4.14	0.87	High	2	3.68	0.83	High	4
15.5 Technological content knowledge	4.15	0.87	High	1	3.61	0.82	High	5

Table 25 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transmission model by the deficit model (continued)

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
15.6 Technological pedagogical knowledge	4.13	0.84	High	3	3.61	0.82	High	5
15.7 Technological pedagogical content knowledge	4.15	0.86	High	1	3.58	0.83	High	6
Overall	4.09	0.85	High		3.61	0.86	High	

Table 25 presents the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in transmission model by the deficit model. The findings show the mean of the current states at a high level ($\bar{X}$ = 3.61, S.D. = 0.86), and the mean of desirable states at a high level ($\bar{X}$ = 4.09, S.D. = 0.85).

With respect to the current states, the findings suggest a high level of the deficit model in developing teachers on productive pedagogies in recognition of difference aspect, which ranks first with the mean at a high level ($\bar{X}$ = 3.67, S.D. = 0.84). When considering each item in recognition of difference aspect, we found that citizenship has the highest mean with the mean at a high level ($\bar{X}$ = 3.76, S.D. = 0.85), followed by inclusivity with the mean at a high level ($\bar{X}$ = 3.74, S.D. = 0.81).

Next, the findings suggest a high level of the deficit model in developing teachers on technological pedagogical content knowledge, which ranks second with the mean at high level ($\bar{X}$ = 3.66, S.D. = 0.81). When considering each item in technological pedagogical content knowledge, we found that content knowledge has the highest mean at a high level ($\bar{X}$ = 3.75, S.D. = 0.79), followed by technological knowledge with the mean at a high level ($\bar{X}$ = 3.72, S.D. = 0.79).

Lastly, as for the lowest ranking among all aspects, the findings suggest a moderate level of the deficit model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a moderate level ($\bar{X}$ = 3.49, S.D. = 0.89).

When considering each item in intellectual quality aspect, we found that substantive conversation has the highest mean at a high level ($\bar{X}$ = 3.63, S.D. = 0.84), followed by higher order thinking with the mean at a high level ($\bar{X}$ = 3.54, S.D. = 0.92).

For the desirable states, the findings suggest a high level of the deficit model in developing teachers on technological pedagogical content knowledge, which ranks first with the mean at a high level ($\bar{X}$ = 4.14, S.D. = 0.84). When considering each item in technological pedagogical content knowledge, we found that content knowledge has the highest mean at a high level ($\bar{X}$ = 4.15, S.D. = 0.80), followed by technological knowledge and pedagogical content knowledge with the mean at high level ($\bar{X}$ = 4.14, S.D. = 0.87).

Next, the findings suggest a high level of the deficit model in developing teachers on productive pedagogies in recognition of difference aspect, which ranks second with the mean at high level ($\bar{X}$ = 4.11, S.D. = 0.83). When considering each item in recognition of difference aspect, we found that citizenship has the highest mean at a high level ($\bar{X}$ = 4.17, S.D. = 0.82), followed by inclusivity with the mean at a high level ($\bar{X}$ = 4.12, S.D. = 0.83).

Lastly, as for the lowest ranking among all aspects, the findings suggest a high level of the deficit model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a high level ($\bar{X}$ = 3.99, S.D. = 0.90). When considering each item in intellectual quality aspect, we found that substantive conversation has the highest mean at a high level ($\bar{X}$ = 4.05, S.D. = 0.88), followed by deep knowledge with the mean at a high level ($\bar{X}$ = 4.00, S.D. = 0.88).

Table 26 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transmission model by the cascade model

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
16. The school uses the cascade model in developing teachers on productive pedagogies in intellectual quality aspect as follows:	4.00	0.90	High	4	3.47	0.90	Moderate	4
16.1 Higher order thinking	4.03	0.88	High	2	3.54	0.87	High	1
16.2 Deep knowledge	4.00	0.90	High	3	3.46	0.89	Moderate	3
16.3 Deep understanding	4.00	0.92	High	3	3.46	0.91	Moderate	3
16.4 Substantive conversation	4.04	0.87	High	1	3.54	0.90	High	1
16.5 Knowledge problematic	3.97	0.92	High	5	3.49	0.92	Moderate	2
16.6 Metalanguage	3.98	0.94	High	4	3.38	0.96	Moderate	4
17. The school uses the cascade model in developing teachers on productive pedagogies in connectedness aspect as follows:	4.17	0.82	High	1	3.68	0.85	High	1
17.1 Knowledge integration	4.14	0.81	High	3	3.72	0.86	High	2
17.2 Background knowledge	4.19	0.84	High	1	3.74	0.80	High	1
17.3 Connectedness to the world	4.19	0.80	High	1	3.66	0.85	High	3
17.4 Problem-based curriculum	4.17	0.84	High	2	3.63	0.91	High	4

Table 26 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transmission model by the cascade model (continued)

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
18. The school uses the cascade model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	4.16	0.84	High	2	3.64	0.87	High	3
18.1 Student control	4.10	0.87	High	3	3.60	0.93	High	5
18.2 Social support	4.19	0.82	High	1	3.68	0.86	High	2
18.3 Engagement	4.19	0.85	High	1	3.63	0.86	High	3
18.4 Explicit criteria	4.19	0.83	High	1	3.70	0.88	High	1
18.5 Self-regulation	4.14	0.86	High	2	3.61	0.84	High	4
19. The school uses the cascade model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	4.15	0.85	High	3	3.68	0.88	High	1
19.1 Cultural knowledge	4.15	0.86	High	2	3.72	0.86	High	2
19.2 Inclusivity	4.23	0.83	High	1	3.79	0.86	High	1
19.3 Narrative	4.15	0.84	High	2	3.62	0.87	High	3
19.4 Group identity	4.10	0.87	High	3	3.56	0.91	High	4
19.5 Citizenship	4.15	0.86	High	2	3.72	0.92	High	2
20. The school uses the cascade model in developing teachers on technological pedagogical content knowledge as follows:	4.16	0.86	High	2	3.65	0.84	High	2
20.1 Content knowledge	4.19	0.82	High	1	3.75	0.83	High	1
20.2 Pedagogical knowledge	4.17	0.87	High	2	3.71	0.82	High	2
20.3 Technological knowledge	4.17	0.85	High	2	3.65	0.89	High	3
20.4 Pedagogical content knowledge	4.17	0.88	High	2	3.64	0.84	High	4
20.5 Technological content knowledge	4.16	0.87	High	3	3.59	0.85	High	7
20.6 Technological pedagogical knowledge	4.16	0.85	High	3	3.63	0.85	High	5
20.7 Technological pedagogical content knowledge	4.14	0.89	High	4	3.61	0.86	High	6
Overall	4.13	0.85	High		3.62	0.87	High	

Table 26 presents the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in transmission model by the cascade model. The findings show the mean of the current

states at a high level ($\bar{X}$= 3.62, S.D. = 0.87), and the mean of the desirable states at a high level ($\bar{X}$= 4.13, S.D. = 0.85).

With respect to the current states, the findings suggest a high level of the cascade model in developing teachers on productive pedagogies in recognition of difference aspect, which ranks first with the mean at a high level ($\bar{X}$= 3.68, S.D. = 0.88). When considering each item in recognition of difference, we found that inclusivity has the highest mean at a high level ($\bar{X}$= 3.79, S.D. = 0.86), followed by cultural knowledge with the mean at a high level ($\bar{X}$= 3.72, S.D. = 0.86), and citizenship with the mean at a high level ($\bar{X}$= 3.72, S.D. = 0.92).

Next, the findings suggest a high level of the cascade model in developing teachers on productive pedagogies in connectedness aspect, which ranks first as well, with the mean at a high level ($\bar{X}$= 3.68, S.D. = 0.85). When considering each item in connectedness aspect, we found that background knowledge has the highest mean at a high level ($\bar{X}$= 3.74, S.D. = 0.80), followed by knowledge integration with the mean at a high level ($\bar{X}$= 3.72, S.D. = 0.86).

Moreover, the findings also suggest a high level of the cascade model in developing teachers on technological pedagogical content knowledge, which ranks second with the mean at a high level ($\bar{X}$= 3.65, S.D. = 0.84). When considering each item in technological pedagogical content knowledge, we found that content knowledge has the highest mean at a high level ($\bar{X}$= 3.75, S.D. = 0.83), followed by pedagogical knowledge with the mean at a high level ($\bar{X}$= 3.71, S.D. = 0.82).

Lastly, as for the lowest ranking among all aspects, the findings suggest a moderate level of the cascade model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a moderate level ($\bar{X}$= 3.47, S.D. = 0.90). When considering each item in intellectual quality aspect, we found that higher order thinking has the highest mean at a high level ($\bar{X}$= 3.54, S.D. = 0.87) as well as substantive conversation with the highest mean at a high level ($\bar{X}$= 3.54, S.D. = 0.90), and followed by knowledge problematic with the mean at a moderate level ($\bar{X}$= 3.49, S.D. = 0.92).

CHULALONGKORN UNIVERSITY

For the desirable states, the findings suggest a high level of the cascade model in developing teachers on productive pedagogies in connectedness aspect, which ranks first with mean at a high level ($\bar{X}$= 4.17, S.D. = 0.82). When considering each item in connectedness aspect, we found that connectedness to the world has the highest mean at a high level ($\bar{X}$= 4.19, S.D. = 0.80) and background knowledge also has the highest mean at a high level ($\bar{X}$= 4.19, S.D. = 0.84), followed by problem-based curriculum with the mean at a high level ($\bar{X}$= 4.17, S.D. = 0.84)

Next, the findings suggest a high level of the cascade model in developing teachers on productive pedagogies in supportive classroom environment aspect, which ranks second with the mean at a high level ($\bar{X}$= 4.16, S.D. = 0.84). When considering each item in supportive classroom environment aspect, we found that social support has the highest mean at a high level ($\bar{X}$= 4.19, S.D. = 0.82). Similarly, explicit criteria has the highest mean at a high level ($\bar{X}$= 4.19, S.D. = 0.83) and engagement has the highest mean at a high level ($\bar{X}$= 4.19, S.D. = 0.85).

Moreover, the findings suggest a high level of the cascade model in developing teachers on technological pedagogical content knowledge, which also ranks second with the mean at a high level ($\bar{X}$= 4.16, S.D. = 0.86). When considering each item in technological pedagogical content knowledge, we found that content knowledge has the highest mean at a high level ($\bar{X}$= 4.19, S.D. = 0.82), while technological knowledge has the second highest mean at a high level ($\bar{X}$= 4.17, S.D. = 0.85), as well as pedagogical knowledge with the mean at a high level ($\bar{X}$= 4.17, S.D. = 0.87), and pedagogical content knowledge with the mean at a high level ($\bar{X}$= 4.17, S.D. = 0.88).

Lastly, as for the lowest ranking among all aspects, the findings suggest a high level of the cascade model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a high level ($\bar{X}$= 4.00, S.D. = 0.90). When considering each item in intellectual quality aspect, we found that substantive conversation has the highest mean at a high level ($\bar{X}$= 4.04, S.D. = 0.87), followed by higher order thinking with the mean at a high level ($\bar{X}$ = 4.03, S.D. = 0.88).

Table 27 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transitional model by the standard-based model

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
21. The school uses the standard-based model in developing teachers on productive pedagogies in intellectual quality aspect as follows:	4.12	0.85	High	5	3.59	0.89	5	High
21.1 Higher order thinking	4.11	0.86	High	3	3.64	0.89	High	2
21.2 Deep knowledge	4.15	0.85	High	1	3.59	0.84	High	3
21.3 Deep understanding	4.09	0.86	High	4	3.55	0.91	High	4
21.4 Substantive conversation	4.14	0.84	High	2	3.66	0.86	High	1
21.5 Knowledge problematic	4.11	0.87	High	3	3.59	0.93	High	3
21.6 Metalanguage	4.14	0.84	High	2	3.53	0.92	High	5
22. The school uses the standard-based model in developing teachers on productive pedagogies in connectedness aspect as follows:	4.24	0.80	High	1	3.74	0.86	1	High
22.1 Knowledge integration	4.26	0.80	High	1	3.76	0.86	High	1
22.2 Background knowledge	4.23	0.82	High	3	3.76	0.83	High	1
22.3 Connectedness to the world	4.25	0.77	High	2	3.73	0.85	High	2
22.4 Problem-based curriculum	4.22	0.81	High	4	3.72	0.9	High	3

Table 27 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transitional model by the standard-based model (continued)

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
23. The school uses the standard-based model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	4.13	0.84	High	4	3.65	0.91	4	High
23.1 Student control	4.13	0.85	High	2	3.64	0.96	High	3
23.2 Social support	4.15	0.84	High	1	3.72	0.89	High	1
23.3 Engagement	4.11	0.84	High	3	3.62	0.92	High	4
23.4 Explicit criteria	4.15	0.85	High	1	3.70	0.88	High	2
23.5 Self-regulation	4.15	0.84	High	1	3.57	0.93	High	5
24. The school uses the standard-based model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	4.23	0.82	High	2	3.70	0.89	2	High
24.1 Cultural knowledge	4.20	0.83	High	4	3.74	0.91	High	2
24.2 Inclusivity	4.29	0.82	High	1	3.74	0.88	High	2
24.3 Narrative	4.21	0.83	High	3	3.63	0.92	High	4
24.4 Group identity	4.20	0.83	High	4	3.65	0.87	High	3
24.5 Citizenship	4.25	0.81	High	2	3.78	0.91	High	1
25. The school uses the standard-based model in developing teachers on technological pedagogical content knowledge as follows:	4.21	0.84	High	3	3.67	0.90	3	High
25.1 Content knowledge	4.24	0.84	High	2	3.76	0.88	High	1
25.2 Pedagogical knowledge	4.25	0.82	High	1	3.72	0.86	High	2
25.3 Technological knowledge	4.22	0.82	High	3	3.71	0.89	High	3
25.4 Pedagogical content knowledge	4.22	0.84	High	3	3.68	0.91	High	4
25.5 Technological content knowledge	4.18	0.88	High	4	3.65	0.88	High	5
25.6 Technological pedagogical knowledge	4.18	0.85	High	4	3.61	0.93	High	6
25.7 Technological pedagogical content knowledge	4.18	0.88	High	4	3.61	0.96	High	6
Overall	4.19	0.83	High		3.67	0.89	High	

Table 27 presents the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in transitional model by the standard-based model. The findings show the mean of the

current states at a high level ($\bar{X}$= 3.67, S.D. = 0.89), and the mean of the desirable states at a high level ($\bar{X}$= 4.19, S.D. = 0.83).

With respect to the current states, the findings suggest a high level of the standard-based model in developing teachers on productive pedagogies in connectedness aspect, which ranks first with the mean at a high level ($\bar{X}$= 3.74, S.D. = 0.86). When considering each item in connectedness aspect, we found that background knowledge has the highest mean at a high level ($\bar{X}$= 3.76, S.D. = 0.83) as well as knowledge integration with the highest mean at a high level ($\bar{X}$= 3.76, S.D. = 0.86), followed by connectedness to the world with the mean at a high level ($\bar{X}$= 3.73, S.D. = 0.85).

Next, the findings suggest a high level of the standard-based model in developing teachers on recognition of difference, which ranks second with the mean at a high level ($\bar{X}$= 3.70, S.D. = 0.89). When considering each item in recognition of difference aspect, we found that citizenship has the highest mean at a high level ($\bar{X}$= 3.78, S.D. = 0.91), followed by inclusivity with the mean at a high level ($\bar{X}$= 3.74, S.D. = 0.88) as well as cultural knowledge with the mean at a high level ($\bar{X}$= 3.74, S.D. = 0.91)

Lastly, as for the lowest ranking among all aspects, the findings suggest a high level of the standard-based model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a high level ($\bar{X}$= 3.59, S.D. = 0.89). When considering each item in intellectual quality aspect, we found that substantive conversation has the highest mean at a high level ($\bar{X}$= 3.66, S.D. = 0.86), followed by higher order thinking with the mean at a high level ($\bar{X}$= 3.64, S.D. = 0.89).

For the desirable states, the findings suggest a high level of the standard-based model in developing teachers on productive pedagogies in connectedness aspect, which ranks first with the mean at a high level ($\bar{X}$= 4.24, S.D. = 0.80). When considering each item in connectedness aspect, we found that knowledge integration has the highest mean at a high level ($\bar{X}$= 4.26, S.D. = 0.80), followed by connectedness to the world with the mean at a high level ($\bar{X}$= 4.25, S.D. = 0.77).

Next, the findings suggest a high level of the standard-based model in developing teachers on productive pedagogies in recognition of difference aspect, which ranks second with the mean at a high level ($\bar{X}$= = 4.23, S.D. = 0.82). When considering each item in recognition of difference aspect, we found that inclusivity has the highest mean at a high level ($\bar{X}$ = 4.29, S.D. = 0.82), followed by citizenship with the mean at a high level ($\bar{X}$= 4.25, S.D. = 0.81).

Lastly, as for the lowest ranking among all aspects, the findings suggest a high level of the standard-based model in developing teachers on productive pedagogies in intellectual quality aspect with mean at a high level ($\bar{X}$= 4.12, S.D. = 0.85). When considering each item in intellectual quality aspect, we found that deep knowledge has the highest mean at a high level ($\bar{X}$= 4.15, S.D. = 0.85), followed by substantive conversation and metalanguage with the mean at a high level ($\bar{X}$= 4.14, S.D. = 0.84)

CHULALONGKORN UNIVERSITY

Table 28 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transitional model by the coaching and mentoring model

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
26. The school uses the coaching/mentoring model in developing teachers on productive pedagogies in intellectual quality aspect as follows:	4.01	0.92	High	5	3.46	0.93	Moderate	5
26.1 Higher order thinking	4.01	0.92	High	4	3.52	0.94	High	2
26.2 Deep knowledge	4.02	0.89	High	3	3.47	0.89	Moderate	3
26.3 Deep understanding	4.04	0.92	High	2	3.44	0.92	Moderate	5
26.4 Substantive conversation	4.06	0.90	High	1	3.54	0.90	High	1
26.5 Knowledge problematic	4.00	0.96	High	5	3.46	0.96	Moderate	4
26.6 Metalanguage	3.96	0.96	High	6	3.36	0.97	Moderate	6
27. The school uses the coaching/mentoring model in developing teachers on productive pedagogies in connectedness aspect as follows:	4.11	0.85	High	4	3.62	0.89	High	3
27.1 Knowledge integration	4.09	0.85	High	3	3.68	0.90	High	1
27.2 Background knowledge	4.17	0.84	High	1	3.67	0.89	High	2
27.3 Connectedness to the world	4.10	0.85	High	2	3.58	0.86	High	3
27.4 Problem-based curriculum	4.09	0.88	High	3	3.55	0.91	High	4
28. The school uses the coaching/mentoring model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	4.14	0.84	High	2	3.64	0.89	High	1
28.1 Student control	4.07	0.89	High	5	3.60	0.96	High	4
28.2 Social support	4.16	0.80	High	2	3.71	0.86	High	1
28.3 Engagement	4.14	0.84	High	4	3.64	0.89	High	3
28.4 Explicit criteria	4.20	0.81	High	1	3.68	0.89	High	2
28.5 Self-regulation	4.15	0.86	High	3	3.58	0.88	High	5

Table 28 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transitional model by the coaching and mentoring model (continued)

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
29. The school uses the coaching/mentoring model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	4.13	0.85	High	3	3.63	0.92	High	2
29.1 Cultural knowledge	4.11	0.86	High	4	3.67	0.94	High	2
29.2 Inclusivity	4.17	0.83	High	1	3.73	0.91	High	1
29.3 Narrative	4.14	0.86	High	3	3.60	0.90	High	4
29.4 Group identity	4.08	0.86	High	5	3.54	0.91	High	5
29.5 Citizenship	4.15	0.87	High	2	3.65	0.96	High	3
30. The school uses the coaching/mentoring model in developing teachers on technological pedagogical content knowledge as follows:	4.16	0.86	High	1	3.61	0.89	High	4
30.1 Content knowledge	4.18	0.84	High	1	3.67	0.89	High	1
30.2 Pedagogical knowledge	4.16	0.86	High	2	3.67	0.85	High	1
30.3 Technological knowledge	4.15	0.89	High	3	3.63	0.94	High	2
30.4 Pedagogical content knowledge	4.15	0.85	High	3	3.62	0.93	High	3
30.5 Technological content knowledge	4.15	0.87	High	3	3.56	0.90	High	5
30.6 Technological pedagogical knowledge	4.15	0.84	High	3	3.56	0.88	High	5
30.7 Technological pedagogical content knowledge	4.16	0.85	High	2	3.57	0.87	High	4
Overall	4.11	0.86	High		3.60	0.90	High	

Table 28 presents the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in transitional model by the coaching and mentoring model. The findings show the mean of the current states at a high level ($\bar{X}$= 3.60, S.D. = 0.90), and the mean of the desirable states at a high level ($\bar{X}$= 4.11, S.D. = 0.86).

With respect to the current states, the findings suggest a high level of the coaching and mentoring model in developing teachers on productive pedagogies in supportive classroom environment aspect, which ranks first with the mean at a high level ($\bar{X}$= 3.64, S.D. = 0.89). When considering each item in supportive classroom environment, we found that social support has the highest mean at a high level ($\bar{X}$=

3.71, S.D. = 0.86), followed by explicit criteria with the mean at a high level ($\bar{X}$= 3.68, S.D. = 0.89).

Next, the findings suggest a high level of the coaching and mentoring model in developing teachers on productive pedagogies in recognition of difference aspect, which ranks second with the mean at a high level ($\bar{X}$= 3.63, S.D. = 0.92). When considering each item in recognition of difference aspect, we found that inclusivity has the highest mean at a high level ($\bar{X}$= 3.73, S.D. = 0.91), followed by cultural knowledge with the mean at a high level ($\bar{X}$= 3.67, S.D. = 0.94).

Lastly, as for the lowest ranking among all aspects, the findings suggest a moderate level of the coaching and mentoring model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a moderate level ($\bar{X}$= 3.46, S.D. = 0.93). When considering each item in intellectual quality aspect, we found that substantive conversation has the highest mean at a high level ($\bar{X}$= 3.54, S.D. = 0.90), followed by higher order thinking with the mean at a high level ($\bar{X}$= 3.52, S.D. = 0.94).

For the desirable states, the findings suggest a high level of the coaching and mentoring model in developing teachers on technological pedagogical content knowledge, which ranks first with the mean at a high level ($\bar{X}$ = 4.16, S.D. = 0.86). When considering each item in technological pedagogical content knowledge aspect, we found that content knowledge has the highest mean at a high level ($\bar{X}$= 4.18, S.D. = 0.84), followed by technological pedagogical content knowledge with the mean at a high level ($\bar{X}$= 4.16, S.D. = 0.85) and pedagogical knowledge with the mean at a high level ($\bar{X}$= 4.16, S.D. = 0.86)

Next, the findings suggest a high level of the coaching and mentoring model in developing teachers on productive pedagogies in supportive classroom environment, which ranks second with the mean at a high level ($\bar{X}$= 4.14, S.D. = 0.84). When considering each item in supportive classroom environment aspect, we found that explicit criteria has the highest mean at a high level ($\bar{X}$= 4.20, S.D. = 0.81), followed by social support with the mean at a high level ($\bar{X}$= 4.16, S.D. = 0.80).

Lastly, as for the lowest ranking among all aspects, the findings suggest a high level of the coaching and mentoring model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a high level ($\bar{X}$= 4.01, S.D. = 0.92). When considering each item in intellectual quality aspect, we found that substantive conversation has the highest mean at a high level ($\bar{X}$= 4.06, S.D. = 0.90), followed by deep understanding with the mean at a high level ($\bar{X}$= 4.04, S.D. = 0.92).

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Table 29 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transitional model by the community of practice model

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
31. The school uses the community of practice model in developing teachers on productive pedagogies in intellectual quality aspect as follows:	4.00	0.86	High	5	3.37	0.92	Moderate	5
31.1 Higher order thinking	3.96	0.86	High	5	3.38	0.92	Moderate	3
31.2 Deep knowledge	3.99	0.85	High	4	3.38	0.90	Moderate	3
31.3 Deep understanding	4.01	0.86	High	2	3.33	0.93	Moderate	5
31.4 Substantive conversation	4.04	0.87	High	1	3.43	0.89	Moderate	1
31.5 Knowledge problematic	4.00	0.89	High	3	3.40	0.92	Moderate	2
31.6 Metalanguage	4.01	0.88	High	2	3.35	0.96	Moderate	4
32. The school uses the community of practice model in developing teachers on productive pedagogies in connectedness aspect as follows:	4.07	0.87	High	3	3.52	0.90	High	2
32.1 Knowledge integration	4.08	0.85	High	2	3.53	0.90	High	1
32.2 Background knowledge	4.09	0.87	High	1	3.53	0.91	High	1
32.3 Connectedness to the world	4.08	0.87	High	2	3.53	0.90	High	1
32.4 Problem-based curriculum	4.05	0.89	High	3	3.50	0.91	High	2
33. The school uses the community of practice model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	4.08	0.87	High	2	3.46	0.91	High	4
33.1 Student control	4.05	0.89	High	4	3.46	0.92	Moderate	2
33.2 Social support	4.08	0.85	High	2	3.52	0.91	High	1
33.3 Engagement	4.06	0.88	High	3	3.42	0.94	Moderate	4
33.4 Explicit criteria	4.10	0.89	High	1	3.45	0.89	Moderate	3
33.5 Self-regulation	4.10	0.86	High	1	3.46	0.89	Moderate	2
34. The school uses the community of practice model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	4.09	0.88	High	1	3.57	0.86	High	1
34.1 Cultural knowledge	4.06	0.88	High	4	3.64	0.88	High	1
34.2 Inclusivity	4.10	0.88	High	2	3.60	0.87	High	2
34.3 Narrative	4.09	0.90	High	3	3.53	0.90	High	3
34.4 Group identity	4.05	0.89	High	5	3.50	0.84	High	4
34.5 Citizenship	4.17	0.88	High	1	3.60	0.85	High	2

Table 29 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transitional model by the community of practice model (continued)

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
35. The school uses the community of practice model in developing teachers on technological pedagogical content knowledge as follows:	4.06	0.88	High	4	3.50	0.90	High	3
35.1 Content knowledge	4.05	0.87	High	4	3.57	0.88	High	1
35.2 Pedagogical knowledge	4.06	0.87	High	3	3.52	0.88	High	2
35.3 Technological knowledge	4.09	0.88	High	1	3.50	0.93	High	3
35.4 Pedagogical content knowledge	4.08	0.88	High	2	3.50	0.91	High	3
35.5 Technological content knowledge	4.06	0.90	High	3	3.46	0.94	Moderate	5
35.6 Technological pedagogical knowledge	4.06	0.89	High	3	3.50	0.89	High	3
35.7 Technological pedagogical content knowledge	4.06	0.89	High	3	3.47	0.88	Moderate	4
Overall	4.06	0.87	High		3.48	0.90	High	

Table 29 presents the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in transitional model by the community of practice model. The findings show the mean of the current states at a moderate level ($\bar{X}$= 3.48, S.D. = 0.90), and the mean of the desirable states at a high level ($\bar{X}$= 4.06, S.D. = 0.87).

With respect to the current states, the findings suggest a high level of the community of practice model in developing teachers on productive pedagogies in recognition of difference aspect, which ranks first with the mean at a high level ($\bar{X}$= 3.57, S.D. = 0.86). When considering each item in recognition of difference aspect, we found that cultural knowledge has the highest mean at a high level ($\bar{X}$= 3.64, S.D. = 0.88), followed by citizenship with the mean at a high level ($\bar{X}$= 3.60, S.D. = 0.85) and also inclusivity with the mean at high level ($\bar{X}$= 3.60, S.D. = 0.87).

Next, the findings suggest a high level of the community of practice model in developing teachers on productive pedagogies in connectedness aspect, which ranks second with the mean at a high level ($\bar{X}$= 3.52, S.D. = 0.90). When considering each item in connectedness aspect, we found that knowledge integration and connectedness to the world have the highest mean at a high level ($\bar{X}$= 3.53, S.D. = 0.90) as well as background knowledge ($\bar{X}$= 3.53, S.D. = 0.91).

Lastly, as for the lowest ranking among all aspects, the findings suggest a moderate level of the community of practice model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a moderate level ($\bar{X}$= 3.37, S.D. = 0.92). When considering each item in intellectual quality aspect, we found that substantive conversation has the highest mean at a moderate level ($\bar{X}$= 3.43, S.D. = 0.89), followed by knowledge problematic with the mean at a moderate level ($\bar{X}$= 3.40, S.D. = 0.92).

For the desirable states, the findings suggest a high level of the community of practice model in developing teachers on productive pedagogies in recognition of difference aspect, which ranks first with the mean at a high level ($\bar{X}$= 4.09, S.D. = 0.88). When considering each item in recognition of difference aspect, we found that citizenship has the highest mean at a high level ($\bar{X}$= 4.17, S.D. = 0.88), followed by inclusivity with the mean at a high level ($\bar{X}$= 4.10, S.D. = 0.88).

Next, the findings suggest a high level of the community of practice model in developing teachers on productive pedagogies in supportive classroom environment, which ranks second with the mean at a high level ($\bar{X}$= 4.08, S.D. = 0.87). When considering each item in supportive classroom environment aspect, we found that self-regulation has the highest mean at a high level ($\bar{X}$= 4.10, S.D. = 0.86) as well as explicit criteria ($\bar{X}$= 4.10, S.D. = 0.89), followed by social support with the mean at a high level ($\bar{X}$= 4.08, S.D. = 0.85).

Lastly, as for the lowest ranking in all aspects, the findings suggest a high level of the community of practice model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a high level ($\bar{X}$= 4.00, S.D. = 0.86). When considering each item in intellectual quality aspect, we found that substantive conversation has the highest mean at a high level ($\bar{X}$= 4.04, S.D. = 0.87), followed by deep understanding with the mean at a high level ($\bar{X}$= 4.01, S.D. = 0.86) as well as metalanguage with the mean at a high level ($\bar{X}$= 4.01, S.D. = 0.86).

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Table 30 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transformative model by the action research model

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
36. The school uses the action research model in developing teachers on productive pedagogies in intellectual quality aspect as follows:	3.98	0.89	High	4	3.34	0.96	Moderate	5
36.1 Higher order thinking	3.96	0.89	High	6	3.36	0.94	Moderate	2
36.2 Deep knowledge	3.98	0.87	High	4	3.33	0.92	Moderate	4
36.3 Deep understanding	3.99	0.93	High	3	3.33	0.94	Moderate	4
36.4 Substantive conversation	4.00	0.89	High	2	3.39	1.00	Moderate	1
36.5 Knowledge problematic	4.02	0.88	High	1	3.34	1.00	Moderate	3
36.6 Metalanguage	3.97	0.93	High	5	3.30	0.98	Moderate	5
37. The school uses the action research model in developing teachers on productive pedagogies in connectedness aspect as follows:	4.09	0.85	High	2	3.49	0.89	Moderate	1
37.1 Knowledge integration	4.08	0.88	High	2	3.50	0.86	High	2
37.2 Background knowledge	4.13	0.83	High	1	3.53	0.93	High	1
37.3 Connectedness to the world	4.07	0.85	High	3	3.43	0.86	Moderate	4
37.4 Problem-based curriculum	4.08	0.85	High	2	3.48	0.93	Moderate	3
38. The school uses the action research model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	4.08	0.87	High	3	3.45	0.92	Moderate	4
38.1 Student control	4.04	0.87	High	5	3.44	0.96	Moderate	3
38.2 Social support	4.11	0.85	High	1	3.52	0.91	High	1
38.3 Engagement	4.09	0.87	High	3	3.41	0.91	Moderate	5
38.4 Explicit criteria	4.10	0.88	High	2	3.46	0.93	Moderate	2
38.5 Self-regulation	4.06	0.88	High	4	3.42	0.90	Moderate	4
39. The school uses the action research model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	4.08	0.88	High	3	3.48	0.95	Moderate	2
39.1 Cultural knowledge	4.09	0.87	High	2	3.54	0.99	High	1
39.2 Inclusivity	4.09	0.91	High	2	3.50	0.97	High	3
39.3 Narrative	4.07	0.88	High	3	3.43	0.95	Moderate	4
39.4 Group identity	4.06	0.89	High	4	3.39	0.93	Moderate	5
39.5 Citizenship	4.11	0.89	High	1	3.53	0.94	High	2

Table 30 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transformative model by the action research model (continued)

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
40. The school uses the action research model in developing teachers on technological pedagogical content knowledge as follows:	4.11	0.88	High	1	3.47	0.92	Moderate	3
40.1 Content knowledge	4.12	0.88	High	2	3.52	0.92	High	1
40.2 Pedagogical knowledge	4.12	0.88	High	2	3.51	0.89	High	2
40.3 Technological knowledge	4.11	0.89	High	3	3.45	0.93	Moderate	5
40.4 Pedagogical content knowledge	4.12	0.90	High	2	3.46	0.92	Moderate	4
40.5 Technological content knowledge	4.11	0.88	High	3	3.45	0.93	Moderate	5
40.6 Technological pedagogical knowledge	4.11	0.86	High	3	3.47	0.93	Moderate	3
40.7 Technological pedagogical content knowledge	4.13	0.89	High	1	3.46	0.98	Moderate	4
Overall	4.07	0.87	High		3.44	0.93	Moderate	

Table 30 presents the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in transformative model by the action research model. The findings show the mean of the current states at moderate level ($\bar{X}$ = 3.44, S.D. = 0.93), and the mean of the desirable states at a high level ($\bar{X}$= 4.07, S.D. = 0.87).

With respect to the current states, the findings suggest a high level of the action research model in developing teachers on productive pedagogies in connectedness aspect, which ranks first with the mean at a moderate level ($\bar{X}$= 3.49, S.D. = 0.89). When considering each item in connectedness aspect, we found that background knowledge has the highest mean at a high level ($\bar{X}$= 3.53, S.D. = 0.93), followed by knowledge integration with the mean at a high level ($\bar{X}$= 3.50, S.D. = 0.86).

Next, the findings suggest a high level of the action research model in developing teachers on productive pedagogies in recognition of difference aspect, which ranks second with the mean at a moderate level ($\bar{X}$= 3.48, S.D. = 0.95). When considering each item in recognition of difference aspect, we found that cultural knowledge has the highest mean at a high level ($\bar{X}$= 3.54, S.D. = 0.99), followed by citizenship with the mean at a high level ($\bar{X}$= 3.53, S.D. = 0.94).

Lastly, as for the lowest ranking among all aspects, the findings suggest a moderate level of the action research model in developing teachers on productive

pedagogies in intellectual quality aspect with the mean at a moderate level ($\bar{X}$= 3.34, S.D. = 0.96). When considering each item in intellectual quality aspect, we found that substantive conversation has the highest mean at a moderate level ($\bar{X}$= 3.39, S.D. = 1.00), followed by higher order thinking with the mean at a moderate level ($\bar{X}$= 3.36, S.D. = 0.94).

For the desirable states, the findings suggest a high level of the action research model in developing teachers on technological pedagogical content knowledge, which ranks first with the mean at a high level ($\bar{X}$= 4.11, S.D. = 0.88). When considering each item in technological pedagogical content knowledge aspect, we found that technological pedagogical content knowledge has the highest mean at a high level ($\bar{X}$= 4.13, S.D. = 0.89), followed by content knowledge and pedagogical knowledge with the same mean at a high level ($\bar{X}$= 4.12, S.D. = 0.88), as well as pedagogical content knowledge with the mean at a high level ($\bar{X}$= 4.12, S.D. = 0.90).

Next, the findings suggest a high level of the action research model in developing teachers on productive pedagogies in connectedness, which ranks second with the mean at a high level ($\bar{X}$= 4.09, S.D. = 0.85). When considering each item in connectedness aspect, we found that background knowledge has the highest mean at a high level ($\bar{X}$= 4.13, S.D. = 0.83), followed by problem-based curriculum with the mean at a high level ($\bar{X}$= 4.08, S.D. = 0.85) and knowledge integration with the mean at a high level ($\bar{X}$= 4.08, S.D. = 0.88).

Lastly, as for the lowest ranking in all aspects, the findings suggest a high level of the action research model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a high level ($\bar{X}$= 3.98, S.D. = 0.89). When considering each item in intellectual quality aspect, we found that knowledge problematic has the highest mean at a high level ($\bar{X}$= 4.02, S.D. = 0.88), followed by substantive conversation with the mean at a high level ($\bar{X}$= 4.00, S.D. = 0.89).

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CHULALONGKORN UNIVERSITY

Table 31 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transformative model by the transformative model

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
41. The school uses the transformative model in developing teachers on productive pedagogies in intellectual quality aspect as follows:	4.01	0.92	High	5	3.47	0.92	Moderate	5
41.1 Higher order thinking	4.00	0.89	High	3	3.53	0.94	High	1
41.2 Deep knowledge	3.98	0.94	High	4	3.46	0.91	Moderate	3
41.3 Deep understanding	4.00	0.93	High	3	3.44	0.88	Moderate	4
41.4 Substantive conversation	4.06	0.91	High	1	3.53	0.91	High	1
41.5 Knowledge problematic	4.01	0.97	High	2	3.48	0.94	Moderate	2
41.6 Metalanguage	4.01	0.92	High	2	3.42	0.96	Moderate	5
42. The school uses the transformative model in developing teachers on productive pedagogies in connectedness aspect as follows:	4.13	0.86	High	3	3.62	0.89	High	2
42.1 Knowledge integration	4.16	0.83	High	1	3.65	0.91	High	1
42.2 Background knowledge	4.14	0.87	High	2	3.65	0.85	High	1
42.3 Connectedness to the world	4.12	0.87	High	3	3.61	0.91	High	2
42.4 Problem-based curriculum	4.11	0.88	High	4	3.59	0.92	High	3
43. The school uses the transformative model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	4.10	0.87	High	4	3.59	0.91	High	4
43.1 Student control	4.07	0.89	High	5	3.60	0.93	High	3
43.2 Social support	4.14	0.85	High	1	3.66	0.87	High	1
43.3 Engagement	4.08	0.86	High	4	3.57	0.91	High	4
43.4 Explicit criteria	4.09	0.86	High	3	3.62	0.91	High	2
43.5 Self-regulation	4.12	0.89	High	2	3.53	0.93	High	5
44. The school uses the transformative model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	4.15	0.87	High	2	3.63	0.90	High	1
44.1 Cultural knowledge	4.20	0.86	High	1	3.69	0.90	High	1
44.2 Inclusivity	4.18	0.88	High	2	3.69	0.90	High	1
44.3 Narrative	4.12	0.90	High	3	3.57	0.88	High	3
44.4 Group identity	4.11	0.85	High	4	3.53	0.94	High	4
44.5 Citizenship	4.18	0.89	High	2	3.68	0.92	High	2

Table 31 Current and desirable states of private school teacher development model based on the concepts of TPACK and Productive pedagogies in transformative model by the transformative model (continued)

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Level	Rank	Current states		Level	Rank
	$\bar{X}$	SD			$\bar{X}$	SD		
45. The school uses the transformative model in developing teachers on technological pedagogical content knowledge as follows:	4.17	0.85	High	1	3.61	0.89	High	3
45.1 Content knowledge	4.20	0.82	High	1	3.67	0.88	High	1
45.2 Pedagogical knowledge	4.19	0.85	High	2	3.67	0.85	High	1
45.3 Technological knowledge	4.18	0.88	High	3	3.65	0.92	High	2
45.4 Pedagogical content knowledge	4.16	0.84	High	5	3.61	0.90	High	3
45.5 Technological content knowledge	4.17	0.84	High	4	3.58	0.91	High	4
45.6 Technological pedagogical knowledge	4.14	0.86	High	6	3.53	0.91	High	5
45.7 Technological pedagogical content knowledge	4.16	0.86	High	5	3.58	0.89	High	4
Overall	4.11	0.87	High		3.58	0.90	High	

Table 31 presents the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in transformative model by the transformative model. The findings show the mean of the current states at a high level ($\bar{X}$= 3.58, S.D. = 0.90), and the mean of the desirable states at a high level ($\bar{X}$= 4.11, S.D. = 0.87).

With respect to the current states, the findings suggest a high level of the transformative model in developing teachers on productive pedagogies in recognition of difference aspect, which ranks first with mean at a high level ($\bar{X}$= 3.63, S.D. = 0.90). When considering each item in recognition of difference aspect, we found that cultural knowledge and inclusivity have the highest mean at a high level ($\bar{X}$= 3.69, S.D. = 0.90), followed by citizenship with the mean at a high level ($\bar{X}$= 3.68, S.D. = 0.92).

Next, the findings suggest a high level of the transformative model in developing teachers on productive pedagogies in connectedness aspect, which ranks second with the mean at a high level ($\bar{X}$= 3.62, S.D. = 0.89). When considering each item in connectedness aspect, we found that background knowledge has the highest mean at a high level ($\bar{X}$= 3.65, S.D. = 0.85) as well as knowledge integration ($\bar{X}$= 3.65, S.D. = 0.91), followed by connectedness to the world with the mean at a high level ($\bar{X}$= 3.61, S.D. = 0.91).

Lastly, as for the lowest ranking among all aspects, the findings suggest a moderate level of the transformative model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a moderate level ($\bar{X}$= 3.47,

S.D. = 0.92). When considering each item in intellectual quality aspect, we found that substantive conversation has the highest mean at a high level ($\bar{X}$= 3.53, S.D. = 0.91) as well as higher order thinking ($\bar{X}$ = 3.53, S.D. = 0.94), followed by knowledge problematic with the mean at a moderate level ($\bar{X}$= 3.48, S.D. = 0.94).

For the desirable states, the findings suggest a high level of the transformative model in developing teachers on technological pedagogical content knowledge, which ranks first with mean at high level ($\bar{X}$= 4.17, S.D. = 0.85). When considering each item in technological pedagogical content knowledge aspect, we found that content knowledge has the highest mean at a high level ($\bar{X}$= 4.20, S.D. = 0.82), followed by pedagogical knowledge with the mean at a high level ($\bar{X}$= 4.19, S.D. = 0.85).

Next, the findings suggest a high level of the transformative model in developing teachers on productive pedagogies in recognition of difference, which ranks second with the mean at a high level ($\bar{X}$= 4.15, S.D. = 0.87). When considering each item in recognition of difference aspect, we found that cultural knowledge has the highest mean at a high level ($\bar{X}$= 4.20, S.D. = 0.86), followed by inclusivity with the mean at a high level ($\bar{X}$= 4.18, S.D. = 0.88) and citizenship with mean at high level ($\bar{X}$= 4.18, S.D. = 0.89).

Lastly, as for the lowest ranking among all aspects, the findings suggest a high level of the transformative model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a high level ($\bar{X}$= 4.01, S.D. = 0.92). When considering each item in intellectual quality aspect, we found that substantive conversation has the highest mean at a high level ($\bar{X}$= 4.06, S.D. = 0.91), followed by metalanguage with the mean at a high level ($\bar{X}$= 4.01, S.D. = 0.92) and knowledge problematic with the mean at a high level ($\bar{X}$= 4.01, S.D. = 0.97).

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Chulalongkorn University

4.2.3 Priority needs, strengths and weaknesses of current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies

The researcher analysed modified priority needs index, strengths and weaknesses from the questionnaire and categorised the variables into groups by using modified priority needs index ($PNI_{Modified}$) . The greatest value of $PNI_{Modified}$ is subtracted by the lowest value of $PNI_{Modified}$ then divided the value by 2. The distance between the highest value of $PNI_{Modified}$ and the lowest value of $PNI_{modified}$ is divided into two areas: higher area and lower area. The higher value of $PNI_{modified}$ represents the weakness of private school teacher development model based on the concepts of TPACK and productive pedagogies, leading to a proposed model as a mean to decrease the weakness. The lower value of $PNI_{modified}$ indicates the strengths of private school teacher development model based on the concepts of TPACK and productive pedagogies. The information was then used for the proposed teacher development model.

When categorised the $PNI_{modifed}$ from the overall analysis of private school teacher development model based on the concepts of TPACK and productive pedagogies, the results are shown below.

Teacher development model

The analysis is divided into 2 groups [(0.180-0.111)/2= 0.036)]

The higher value of $PNI_{modified}$ group is 0.147-0.180

The lower value of $PNI_{modified}$ group is 0.111-0.146

Productive Pedagogies aspects

The analysis is divided into 2 groups [(0.152-0.132)/2= 0.010)]

The higher value of $PNI_{modified}$ group is 0.142-0.152

The lower value of $PNI_{modified}$ group is 0.132-0.141

The items of productive pedagogies can be divided into 4 aspects

1) Intellectual quality

The analysis is divided into 2 groups [(0.183-0.138)/2=0.0225)]

The higher value of $PNI_{modified}$ group is 0.161-0.183

The lower value of $PNI_{modified}$ group is 0.138-0.160

2) Connectedness

The analysis is divided into 2 groups [(0.147-0.120)/2=0.0135)]

The higher value of $PNI_{modified}$ group is 0.135-0.147

The lower value of $PNI_{modified}$ group is 0.120-0.134

3) Supportive classroom environment

The analysis is divided into 2 groups [(0.153-0.130)/2=0.0115)]

The higher value of $PNI_{modified}$ group is 0.142-0.153

The lower value of $PNI_{modified}$ group is 0.130-0.141

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Chulalongkorn University

4) Recognition of difference

The analysis is divided into 2 groups [(0.152-0.119)/2=0.0165)]

The higher value of $PNI_{modified}$ group is 0.136-0.152

The lower value of $PNI_{modified}$ group is 0.119-0.135

The component of technological pedagogical knowledge (TPACK)

The analysis is divided into 2 groups [(0.157-0.123)/2=0.017)]

The higher value of $PNI_{modified}$ group is 0.141-0.157

The lower value of $PNI_{modified}$ group is 0.123- 0.140

Table 32 The overall modified priority needs index of private school teacher development model based on the concepts of TPACK and productive pedagogies

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Current states		Priority needs		Analysis
	$\bar{X}$	SD	$\bar{X}$	SD	$PNI_{modified}$	Grouping	
Development Models	4.11	0.86	3.59	0.90	0.141	Low	Strength
Transmission Model	4.12	0.85	3.65	0.88	0.129	Low	Strength
1. The Training Model	4.11	0.86	3.70	0.88	0.111	Low	Strength
2. The Award-bearing Model	4.10	0.86	3.64	0.89	0.126	Low	Strength
3. The Deficit Model	4.09	0.85	3.61	0.86	0.133	Low	Strength
4. The Cascade Model	4.13	0.85	3.62	0.87	0.138	Low	Strength
5. The Standard-based Model	4.19	0.83	3.67	0.89	0.138	Low	Strength
Transitional Model	4.08	0.87	3.53	0.90	0.156	High	Weakness
6. The Coaching/Mentoring Model	4.10	0.86	3.59	0.90	0.142	Low	Strength
7. The Community of Practice Model	4.06	0.87	3.48	0.89	0.167	High	Weakness
Transformative Model	4.09	0.87	3.51	0.91	0.165	High	Weakness
8. The Action Research Model	4.07	0.87	3.44	0.92	0.180	High	Weakness
9. The Transformative Model	4.11	0.87	3.58	0.90	0.148	High	Weakness

From table 32 we found that the overall modified priority needs index of private school teacher development based on the concepts of TPACK and productive pedagogies is in the low group ($PNI_{modified} = 0.141$), which is the strength of private school teacher development model based on the concepts of TPACK and productive pedagogies.

Analysed by the overall development models, the high priority needs models are transformative model ($PNI_{modified} = 0.165$), and transitional model ($PNI_{modified} = 0.156$), which are the weaknesses of private school teacher development model based on the concepts of TPACK and productive pedagogies.

The low priority needs model is transitional model ($PNI_{modified} = 0.129$), which are the strengths of private school teacher development model based on the concepts of TPACK and productive pedagogies.

Analysed by development models, the priority needs models are the action research model ($PNI_{modified} = 0.180$), the community of practice model ($PNI_{modified} = 0.167$), and the transformative model ($PNI_{modified} = 0.148$), which are the weaknesses of private school teacher development model based on the concepts of TPACK and productive pedagogies.

The low priority needs models are the coaching and mentoring model ($PNI_{modified} = 0.142$), the standard-based model ($PNI_{modified} = 0.138$), the cascade model ($PNI_{modified} = 0.138$), the deficit model ($PNI_{modified} = 0.133$), the award-bearing model ($PNI_{modified} = 0.126$), and the training model ($PNI_{modified} = 0.111$), which are the strengths

of private school teacher development model based on the concepts of TPACK and productive pedagogies.

Table 33 The overall modified priority needs index of private school teacher development model based on the concepts of TPACK and productive pedagogies in productive pedagogies aspect.

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Current states		Priority needs		Analysis
	$\bar{X}$	SD	$\bar{X}$	SD	$PNI_{modified}$	Grouping	
Productive Pedagogies	4.10	0.85	3.59	0.89	0.141	Low	Strength
1. Intellectual Quality	4.00	0.89	3.47	0.92	0.152	High	Weakness
1.1 Higher order thinking	3.99	0.89	3.50	0.92	0.138	Low	Strength
1.2 Deep knowledge	3.99	0.89	3.44	0.89	0.158	Low	Strength
1.3 Deep understanding	4.04	0.88	3.54	0.90	0.141	Low	Strength
1.4 Substantive conversation	4.04	0.88	3.54	0.90	0.141	Low	Strength
1.5 Knowledge problematic	3.98	0.93	3.45	0.93	0.154	Low	Strength
1.6 Metalanguage	3.99	0.91	3.37	0.95	0.183	High	Weakness
2. Connectedness	4.13	0.83	3.64	0.88	0.134	Low	Strength
2.1 Knowledge integration	4.13	0.83	3.69	0.88	0.120	Low	Strength
2.2 Background knowledge	4.17	0.83	3.70	0.86	0.127	Low	Strength
2.3 Connectedness to the world	4.12	0.83	3.60	0.88	0.144	High	Weakness
2.4 Problem-based curriculum	4.10	0.86	3.57	0.90	0.147	High	Weakness
3. Supportive Classroom Environment	4.10	0.85	3.59	0.90	0.142	High	Weakness
3.1 Student control	4.05	0.89	3.54	0.95	0.143	High	Weakness
3.2 Social support	4.13	0.83	3.65	0.88	0.130	Low	Strength
3.3 Engagement	4.10	0.85	3.56	0.91	0.152	High	Weakness
3.4 Explicit criteria	4.13	0.85	3.64	0.88	0.133	Low	Strength
3.5 Self-regulation	4.11	0.86	3.56	0.88	0.153	High	Weakness
4. Recognition of Difference	4.14	0.85	3.65	0.88	0.132	Low	Strength
4.1 Cultural knowledge	4.14	0.84	3.70	0.90	0.119	Low	Strength
4.2 Inclusivity	4.18	0.85	3.73	0.88	0.122	Low	Strength
4.3 Narrative	4.12	0.85	3.60	0.88	0.143	High	Weakness
4.4 Group identity	4.08	0.87	3.54	0.88	0.152	High	Weakness
4.5 Citizenship	4.18	0.85	3.71	0.89	0.125	Low	Strength

From table 33 we found that the overall modified priority needs index of private school teacher development based on the concepts of TPACK and productive pedagogies in productive pedagogies aspect is in the low group ($PNI_{modified} = 0.141$) ,which is the strength of productive pedagogies aspect in private school teacher development model.

Analysed by overall productive pedagogies aspect, the high priority needs aspects are intellectual quality ($PNI_{modified} = 0.152$), supportive classroom environment ($PNI_{modified} = 0.142$), which are the weaknesses of productive pedagogies.

The low priority needs productive pedagogies are connectedness ($PNI_{modified} = 0.134$), and recognition of difference ($PNI_{modified} = 0.132$), which are the strengths of productive pedagogies.

When considering each item in intellectual quality aspect of productive pedagogies we found the high priority needs is metalanguage ($PNI_{modified} = 0.183$), which is the weakness of intellectual quality aspect. The low priority needs are higher order thinking ($PNI_{modified} = 0.138$), deep knowledge ($PNI_{modified} = 0.158$), deep understanding ($PNI_{modified} = 0.141$), substantive conversation ($PNI_{modified} = 0.141$), and knowledge problematic ($PNI_{modified} = 0.154$), which are the strengths of productive pedagogies.

For connectedness aspect of productive pedagogies, the high priority needs are connectedness to the world ($PNI_{modified} = 0.144$), and problem-based curriculum ($PNI_{modified} = 0.147$), which are the weaknesses of connectedness aspect. The low priority needs are knowledge integration ($PNI_{modified} = 0.120$), and background knowledge ($PNI_{modified} = 0.127$), which is the strength of connectedness aspect.

Supportive classroom environment aspect high priority needs are student control ($PNI_{modified} = 0.143$), engagement ($PNI_{modified} = 0.152$), and self-regulation ($PNI_{modified} = 0.153$), which are the weaknesses of supportive classroom environment aspect. The low priority needs are social support ($PNI_{modified} = 0.130$), and explicit criteria ($PNI_{modified} = 0.130$), which are the strengths of supportive classroom environment aspect.

Lastly, for recognition of difference aspect, the high priority needs are narrative ($PNI_{modified} = 0.143$), and group identity ($PNI_{modified} = 0.152$), which are the weaknesses in recognition of difference aspect. The low priority needs are cultural knowledge ($PNI_{modified} = 0.119$), inclusivity ($PNI_{modified} = 0.122$), and citizenship ($PNI_{modified} = 0.125$), which are the strengths of recognition of difference aspect.

CHULALONGKORN UNIVERSITY

Table 34 The overall modified priority needs index of private school teacher development model based on the concepts of TPACK and productive pedagogies in technological pedagogical content knowledge

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Current states		Priority needs		Analysis
	$\bar{X}$	SD	$\bar{X}$	SD	$PNI_{modified}$	Grouping	
Technological Pedagogical Content Knowledge (TPACK)	4.16	0.85	3.63	0.87	0.143	High	Weakness
1. Content knowledge	4.17	0.89	3.71	0.86	0.123	Low	Strength
2. Pedagogical knowledge	4.17	0.84	3.68	0.84	0.132	Low	Strength
3.Technological knowledge	4.17	0.85	3.65	0.88	0.140	Low	Strength
4. Pedagogical content knowledge	4.16	0.86	3.63	0.88	0.143	High	Weakness
5. Technological content knowledge	4.15	0.86	3.59	0.88	0.155	High	Weakness
6. Technological pedagogical knowledge	4.15	0.85	3.59	0.88	0.156	High	Weakness
7. Technological pedagogical content knowledge	4.15	0.86	3.58	0.89	0.157	High	Weakness

From table 34 we found that the overall modified priority needs index of private school teacher development based on the concepts of TPACK and productive pedagogies in technological pedagogical content knowledge is in high group ($PNI_{modified} = 0.143$) ,which is the weakness of technological pedagogical content knowledge in private school teacher development model.

Analysing the data we found the high priority needs are pedagogical content knowledge ($PNI_{modified} = 0.143$), technological content knowledge ($PNI_{modified} = 0.155$), technological pedagogical knowledge ($PNI_{modified} = 0.156$) , and technological pedagogical content knowledge ($PNI_{modified} = 0.157$), which are the weaknesses in technological pedagogical content knowledge.

The low priority needs are content knowledge ($PNI_{modified} = 0.123$) , pedagogical knowledge ($PNI_{modified} = 0.132$), and technological knowledge ($PNI_{modified} = 0.140$), which are the strengths of technological pedagogical content knowledge.

Table 35 The overall analysis of modified priority needs index, strength, weakness, and major problems of private school teacher development model based on the concepts of TPACK and productive pedagogies

Teacher Development Model	Strength	Weakness	Major Problems
Teacher Development Model: The models use in developing teachers			
1. Transmission Model ($PNI_{modified}$ = 0.129) (Strength)	The training model ($PNI_{modified}$ = 0.111) The award-bearing model ($PNI_{modified}$ = 0.126) The deficit model ($PNI_{modified}$ = 0.133) The cascade model ($PNI_{modified}$ = 0.138) The standard-based model ($PNI_{modified}$ = 0.138)		
2. Transitional Model ($PNI_{modified}$ = 0.156) (Weakness)	The coaching and mentoring model ($PNI_{modified}$ = 0.142)	The community of practice model ($PNI_{modified}$ = 0.167)	1. From the analysis of strengths and weaknesses, we found that several development models have not been implemented extensively and are in need for the development of out-of-field teachers. 1. The community of practice model 2. The action research model 3. The transformative model 4. The coaching and mentoring model
3. Transformative Model ($PNI_{modified}$ = 0.165) (Weakness)		The action research model ($PNI_{modified}$ = 0.180) The transformative model ($PNI_{modified}$ = 0.148)	
Productive Pedagogies			
1.Intellectual Quality ($PNI_{modified}$ = 0.152) (Weakness)	Higher order thinking ($PNI_{modified}$ = 0.138) Deep knowledge ($PNI_{modified}$ = 0.158) Deep understanding ($PNI_{modified}$ = 0.141) Substantive conversation ($PNI_{modified}$ = 0.141) Knowledge Problematic ($PNI_{modified}$ = 0.154)	Metalanguage ($PNI_{modified}$ = 0.183)	2. In the aspect of intellectual quality, the area of metalanguage or language, grammar, and technical vocabulary has not been given importance; the teachers' practice does not reflect this, or it is an area we need to develop teachers. 3. Deep knowledge and details covered in lessons must be considered in teacher development 4. Knowledge problematic of the current issues and ideas - subjects must be critically analysed by the students.

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Table 35 The overall analysis of modified priority needs index, strengths, weaknesses, and major problems of private school teacher development model based on the concepts of TPACK and productive pedagogies (continued)

Teacher Development Model	Strengths	Weaknesses	Major Problems
Productive Pedagogies			
2. Connectedness ($PNI_{modified}$ = 0.134) (Strength)	Knowledge integration ($PNI_{modified}$ = 0.120) Background knowledge ($PNI_{modified}$ = 0.127)	Connectedness to the world ($PNI_{modified}$ = 0.144) Problem-based curriculum ($PNI_{modified}$ = 0.147)	5. The teaching should connect to competencies and content outside knowledge in the classroom 6. In class, there should be a focus on identifying and solving real world problems
3. Supportive Classroom Environment ($PNI_{modified}$ = 0.142) (Weakness)	Social support ($PNI_{modified}$ = 0.130) Explicit criteria ($PNI_{modified}$ = 0.133)	Student control ($PNI_{modified}$ = 0.143) Engagement ($PNI_{modified}$ = 0.152) Self-regulation ($PNI_{modified}$ = 0.153)	7. Teachers need to understand the importance of having students determine activities or outcomes of the lessons. 8. Teachers need to be able to make students engaged and be on-task during the lesson.
4. Recognition of difference ($PNI_{modified}$ = 0.132) (Strength)	Cultural knowledge ($PNI_{modified}$ = 0.119) Inclusivity ($PNI_{modified}$ = 0.122) Citizenship ($PNI_{modified}$ = 0.125)	Narrative ($PNI_{modified}$ = 0.143) Group identity ($PNI_{modified}$ = 0.152)	9. Teachers should be able to narrate all the connected knowledge in their teaching. 10. Teachers should be able to build a community of learning in their students.
TPACK: Knowledge output of teacher development			
6. Technological Pedagogical Content Knowledge ($PNI_{modified}$ = 0.143) (Weakness)	Content knowledge ($PNI_{modified}$ = 0.123) Pedagogical knowledge ($PNI_{modified}$ = 0.132) Technological knowledge ($PNI_{modified}$ = 0.140)	Pedagogical content knowledge ($PNI_{modified}$ = 0.143) Technological content knowledge ($PNI_{modified}$ = 0.155) Technological pedagogical knowledge ($PNI_{modified}$ = 0.156) Technological pedagogical content knowledge ($PNI_{modified}$ = 0.157)	11. The integration between technology, pedagogy and content knowledge must be emphasised in a way that teachers can integrate all the knowledge into practice - PCK, TCK, TPK, and TPCK.

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4.3 Private school teacher development model "ACCT teacher development model" (1st draft)

From the analysis of modified priority needs index, we then calculated the mean PNI for development models, aspects of productive pedagogies, and technological pedagogical content knowledge as well as analysed the strengths and weaknesses. We then chose the main models, aspects of productive pedagogies, and technological pedagogical content knowledge that lay in the weakness area and then

chose the sub-models, items of productive pedagogies, and TPACK based on PNI values above the mean PNI for each area and formulated private school teacher development model based on the concepts of TPACK and productive pedagogies. The higher the PNI value, the more it is needed to be put in the development model, as it is the area of weakness and low strength. The development of private school teacher development model based on the concepts of TPACK and productive pedagogies (1st draft) found "ACCT Teacher Development Model" which includes 1. Teacher development model title, 2. The importance of teacher development model, 3. Teacher development model objectives, 4. Teacher development model main characteristics, 5. The implementation of teacher development model, and 6. Measurement and evaluation of teacher development model.

1) Teacher Development Model Title: ACCT Teacher Development Model

A represents "Action Research Model"
C represents "Coaching and mentoring Model"
C represents "Community of Practice Model"
T represents "Transformational Model"

2) The Importance of Teacher Development Model

The effectiveness of administrators is a key to drive organisations or schools. Superintendents, principals, and others with authority in school systems are instrumental in providing the vision, time, and resources to support continual professional learning, a positive school climate, and success for all students. Administrators are in charge and responsible for planning resources such as man, money, materials and methods to bring out an effective organization or school. One of the important resources in all organizations is man or employees; in school context, it is teachers. School administrators have to support and enhance teachers' knowledge, capability, skills etc. so they can bring success for all students.

Specifically, in Thailand where we have many "out-of-field" teachers, we need to make sure that they feel confident in teaching and support them on their teaching practice. According to Prahakul and Traiwichikhun (2016), it is found that 59.4 % of Thai teachers who are working under the Office of Primary Education Service Areas have been assigned to teach out-of-field and there is a significant impact on student's academic achievement comparing to in-field teachers.

According to Hobbs (2012), school administrators need to consider the school context, school support and development plans, and teachers' prior knowledge and relating knowledge to out-of-field teachers in developing a professional development programme for out-of-field teachers. She further explains that there is still a lack of understanding of the significance of out-of-field teaching experiences and it is an international concern to perceive that it is acceptable to put out-of-field teachers to positions out of their field. From the statements, we can see that there are special

characteristics of out-of-field teachers and it is the reason why we need to pay attention to this.

From the analysis of modified priority needs index of teacher development model we found that 4 models have a higher priority needs than average (Mean PNI= 0.141). These are the action research model (PNI= 0.180), the community of practice (PNI= 0.167), the transformative model (PNI= 0.148), and the coaching and mentoring model (PNI=0.142).

For the analysis of modified priority needs index of productive pedagogies we found two aspects that have higher than average mean of modified priority needs index (Mean PNI= 0.141). These are intellectual quality (PNI= 0.152) and supportive classroom environment (PNI= 0.142). When we consider each item of intellectual quality aspect, we found that metalanguage (PNI=0.183), deep knowledge (PNI=0.158), and knowledge problematic (PNI= 0.154) have modified priority needs index higher than average. While in supportive classroom environment aspect, we found that self-regulation (PNI=0.153), engagement (PNI=0.152), and student control (PNI=0.143) have modified priority needs index higher than average.

For the analysis of modified priority needs index of technological pedagogical content knowledge we found 4 types of knowledge that have the mean higher than the average mean of modified priority needs index (Mean PNI= 0.143). These are technological pedagogical content knowledge (PNI= 0.157), technological pedagogical knowledge (PNI= 0.156), technological content knowledge (PNI= 0.155), and pedagogical content knowledge (PNI=0.143).

From the analysis of modified priority needs index we can design private school teacher development model based on the concepts of TPACK and productive pedagogies (1st draft).

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3) Objectives of teacher development model

3.1) To develop private school out-of-field teachers with the transitional and transformative teacher development models

3.2) To develop private school out-of-field teacher on technological pedagogical content knowledge and productive pedagogies

3.3) To develop private school out-of-field teacher teaching to be able to elevate student's academic achievement

4) Teacher development model main characteristics

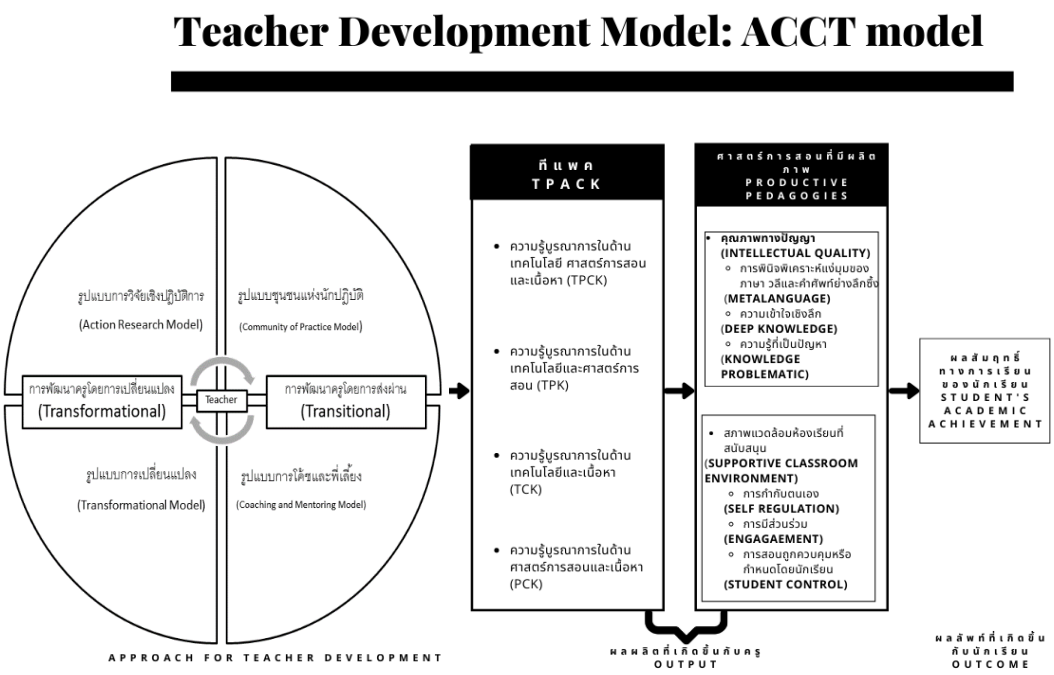

Figure 6 shows ACCT teacher development model (1st draft)

4. 1) Models for teacher development: there are two main models for developing teacher in this model. The first one is transitional model; the main characteristic of this model is that it relies on both experts and community as a knowledge platform and community of practice. It reflects the reflective dialogue where constant feedback is an ongoing process. While certain level of autonomy depends on the role of the participants. While transformative model suggests strong links between theory and practice, internalisation of concepts, reflection, construction of new knowledge and its application in different situations, and an awareness of the professional and political context. Transformative models of CPD have the capacity to support considerable professional autonomy at both individual and profession-wide levels. There are two development models in each model as follows:

Teacher development in transitional model

(1) Teacher development in transitional model by community of practice model: The community of practice model refers to the model that evolve forms of mutual engagement that happens as a result of that community and its interaction that promote community of practice and generally involves more than two people. The community is central to the internalisation of professional development.

(2) Teacher development in transitional model by coaching and mentoring model: The coaching/mentoring model refers to the model that covers a variety of professional development practices that are based on a range of

philosophical premises. However, the defining characteristic of this model is the importance of the one-to-one relationship, generally between two teachers, which is designed to support professional development.

Teacher development in transformative model

(1) **Teacher development in transformative model by action research model**: The action research model refers to the study of a social situation, involving the participants themselves as researchers, with a view to improving the quality of action within it. The 'quality of action' can be perceived as the participants' understanding of the situation, as well as the practice within the situation

(2) **Teacher development in transformative model by transformative model**: The transformative model refers to the model that supports educational change with professional development that involves the combination of a number of processes and conditions – aspects of which are drawn from other models. The central characteristic is the combination of practices and conditions that support a transformative agenda. In this sense, it could be argued that the transformative model is not a clearly definable model in itself; rather it recognises the range of different conditions required for transformative practice. The key characteristic of the transformative model is its effective integration of the range of models described above, together with a real sense of awareness of issues of power, i.e. whose agendas are being addressed through the process.

4.2) Output of teacher development: Technological pedagogical content knowledge and productive pedagogies

TPACK refers to the complex interplay of three primary forms of knowledge, which are technological knowledge, pedagogical knowledge and content knowledge. And productive pedagogies are the twenty productive pedagogies under the four dimensions that are constructed in the productive pedagogies classroom reflection manual, as a guide from Queensland education, to provide an index of quality teaching and students' learning and to be used to help teachers to reflect on their classroom practices and generating professional development dialogue.

Technological pedagogical content knowledge for this (1st draft) teacher development model

(1) Pedagogical Content Knowledge (PCK) refers to knowledge of pedagogy that is applicable to the teaching of specific content. It is the notion of the transformation of the subject matter for teaching.

(2) Technological Content Knowledge (TCK) refers to an understanding of the manner in which technology and content influence and constrain one another.

(3) Technological Pedagogical Knowledge (TPK) refers to an understanding of how teaching and learning can change when particular technologies are used in particular ways.

(4) Technological Pedagogical Content Knowledge (TPACK) refers to a deeply skilled teaching with technology. It is the basis of effective teaching with

technology, requiring an understanding of the presentation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help address some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones.

Productive pedagogies for this (1st draft) teacher development model

Productive pedagogies express the meaning and value of what "quality teaching" might look like and provide a descriptive language to support and engage teachers with sustained professional dialogue about their practices and performances. These two dimensions can provide teachers with a snapshot of their classroom practices that should be present to ensure that the intellectual and social outcomes of all students are improved.

Intellectual quality: Deep knowledge (Does the lesson cover operational fields in any depth, detail or level of specificity?), Knowledge problematic (Are students critically examining texts, ideas and knowledge?), Metalanguage (Are aspects of language, grammar and technical vocabulary being given prominence?).

Supportive classroom environment: Student control (Do students determine specific activities or outcomes of the lesson?), Engagement (Are students engaged and on-task during the lesson?), and Self-regulation (Is the direction of student behavior implicit and self-regulatory?).

4.3) Outcome: elevated student's academic achievement

5) Implementation of teacher development model

The researcher developed Acct Teacher Development Model for private school out-of-field teachers so that they can teach effectively and able to raise student's achievement. School administrators should study teacher development model main characteristics and imply the model according to the school context. These are steps in implementing ACCT Teacher Development Model:

5.1) School administrators must realise and see the importance of out-of-field teachers and participate in the development of out-of-field teachers to raise student's academic achievement.

5.2) School administrators and teachers must decide and agree on the main models and sub models that are most suitable to the development topics.

5.3) School administrators and teachers make a decision on the main models and sub models that best suit their school context.

5.4) School administrators and teachers make a decision on knowledge to develop for out-of-field teachers that are able to bring out student's achievement.

5.5) Teachers must participate in the exchange of knowledge on technological pedagogical content knowledge and productive pedagogies.

5.6) School administrators' role is to learn and be a mediator in the development process and support each teacher.

5.7) Educational personnel in school should cooperatively work towards understanding the needs of out-of-filed teachers and better support them.

5.8) Schools need to have a grading system that is able to track each student's academic achievement and reflect the information of student's success factors to out-of-field teachers; these success factors can also be shared with the public or community.

6) Measurement and evaluation of teacher development model

6.1) Measure and evaluate teacher's satisfaction towards teacher's development by using satisfaction form.

6.2) Measure and evaluate teacher's knowledge on TPACK by using open-ended tests.

6.3) Measure and evaluate teacher's knowledge on productive pedagogies by using open-ended tests.

6.4) Measure and evaluate student's academic achievement by using tests.

4.4 Appropriateness and feasibility of private school teacher development model "ACCT teacher development model" (1st draft) by experts

The researcher sent the evaluation forms to all 20 experts to validate the appropriateness and feasibility of ACCT teacher development model.

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Table 36 Experts' numbers and fields of expertise for evaluating the appropriateness and feasibility of private school teacher development model "ACCT teacher development model" (1st draft)

Groups	Fields of Expertise	Numbers	
		Number of Experts	Percentage
1	Educational Administration	5	25.00
2	Teacher Development	4	20.00
3	School Administration	7	35.00
4	Teaching and Pedagogy	4	20.00
Total		20	100.00

Table 36 shows that 20 experts evaluated the appropriateness and feasibility of private school teacher development model "ACCT teacher development model". There were 5 experts from educational administration field, 3 from teacher development field, 7 from school administration field, and 5 from teaching and pedagogy field.

Table 37 Experts' evaluation on the appropriateness of components of private school teacher development model "ACCT teacher development model" (1st draft)

Components of private school teacher development model "ACCT teacher development model"	Appropriate	Percentage	Need adjustment	Percentage	Inappropriate	Percentage	Total	Percentage	Suggestions
1. Model Title in Thai	16	80.00	4	20.00	-	-	20	100.00	- Why don't you use the word out-of-field teachers in the name of this model?
2. Model Title in English	15	75.00	5	25.00	-	-	20	100.00	- Need to know where ACCT comes from
3. Importance of teacher development model	14	70.00	6	30.00	-	-	20	100.00	-Need more clarification and English terms -Need more explanation on TPACK and productive pedagogies -Need more concrete evidence, such as number of out-of-field teachers or the real problems to adopt this model -How do you get PNI values? Need more explanation
4. Teacher development model objectives	14	70.00	6	30.00	-	-	20	100.00	-Can the model develop in-field teachers? Is the scope too narrow? -The objective doesn't need to limit to private schools only
5. Teacher development model main characteristics	14	70.00	6	30.00	-	-	20	100.00	- The arrow in model box may mean using all the models. -Bigger teacher development model graphic -Need clearer explanation of transformative model -Need to know what the end result of applying each model is- not just definition
6. Implementation of teacher development model	17	85.00	3	15.00	-	-	20	100.00	- The development model needs to raise teacher awareness - Who are educational stakeholders?
7. Measurement and evaluation of teacher development model	17	85.00	3	15.00	-	-	20	100.00	- Should evaluate teacher teaching practice - It is hard to measure productive pedagogies; it is more of a process. -You can measure knowledge about TPACK by test but you need to look at teacher's lesson plan to measure productive pedagogies -Need positive type of evaluation - Micro teaching may be a better measurement

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Table 37 Experts' evaluation on the appropriateness of components of private school teacher development model " ACCT teacher development model" (1st draft) (continued)

Other suggestions: 1. The evaluator does not have enough knowledge on all of the development models, so it might be hard to understand all the contents in this evaluation form. There is a need for more information on measurement and evaluation of teacher development model. 2. Do TPACK and productive pedagogies output happening at the same time? If so, there might be a need to change the graphic of the model. 3. Next year we may change curriculum based on core subjects to competencies. 4. Evaluation form needs a clearer explanation on appropriateness and feasibility of the model. 5. The teacher development model maybe put in the ranking by PNI values. 6. How do you put the proposed model into practice? We need a manual telling us exactly what to do.

From the table 37 we can see that the evaluation of the components of ACCT teacher development model is above 70 percent and there are comments regarding the model. The researcher can conclude that ACCT teacher development model components is appropriate but there are some changes needed to be made in the area of definition of the model in addition to the clearer implementation process, and more positive way to measure the effectiveness of the model.

Table 38 Evaluation result of appropriateness and feasibility of Private school teacher development model "ACCT teacher development model" (1st draft) by experts

ACCT Teacher development model (First Draft)	Appropriateness			Feasibility		
	$\bar{X}$	SD	Signifies	$\bar{X}$	SD	Signifies
Teacher development models	4.56	0.66	Very high	4.58	0.66	Very high
1. Teacher development by transformative model with action research model	4.55	0.60	Very high	4.50	0.69	High
2. Teacher development by transformative model with transformative model	4.35	0.99	High	4.30	0.98	High
3. Teacher development by transitional model with community of practice model	4.60	0.60	Very high	4.70	0.57	Very high
4. Teacher development by transitional model with coaching and mentoring model	4.75	0.44	Very high	4.80	0.41	Very high
Technological pedagogical content knowledge	4.70	0.52	Very high	4.70	0.55	Very high
1. Technological pedagogical content knowledge	4.80	0.41	Very high	4.75	0.55	Very high
2. Technological pedagogical knowledge	4.65	0.59	Very high	4.65	0.59	Very high
3. Technological content knowledge	4.65	0.59	Very high	4.70	0.57	Very high
4. Pedagogical content knowledge	4.70	0.47	Very high	4.70	0.47	Very high

Table 38 Evaluation result of appropriateness and feasibility of Private school teacher development model "ACCT teacher development model" (1st draft) by experts (continued)

ACCT Teacher development model (First Draft)	Appropriateness			Feasibility		
	$\bar{X}$	SD	Signifies	$\bar{X}$	SD	Signifies
Productive pedagogies	4.48	0.67	High	4.28	1.00	High
Intellectual quality	4.33	0.80	High	4.12	1.11	High
1. Metalanguage	4.20	0.77	High	4.00	1.08	High
2. Deep knowledge	4.50	0.76	Very high	4.25	1.07	High
3. Knowledge problematic	4.30	0.86	High	4.10	1.17	High
Supportive classroom environment	4.63	0.55	Very high	4.45	0.89	High
1. Self-regulation	4.60	0.50	Very high	4.40	1.04	High
2. Engagement	4.60	0.68	Very high	4.40	0.88	High
3. Student control	4.70	0.47	Very high	4.55	0.76	Very high
Overall	4.56	0.55	Very high	4.46	0.80	High

From the table 38 we can see the evaluation of appropriateness and feasibility of ACCT teacher development model (First draft). The overall mean on the appropriateness was very high ($\bar{X}$= 4.56, S.D. = 0.55) and the feasibility was high ($\bar{X}$= 4.46, S.D. = 0.80). When considering teacher development models, we found that the appropriateness of teacher development models was very high ($\bar{X}$= 4.56, S.D. = 0.66) and the feasibility was very high as well ($\bar{X}$= 4.58, S.D. = 0.66). Moreover, technological pedagogical content knowledge appropriateness ($\bar{X}$= 4.70, S.D. = 0.52) and feasibility ($\bar{X}$= 4.70, S.D. = 0.55) was very high; both productive pedagogical appropriateness ($\bar{X}$= 4.48, S.D. = 0.67) and feasibility ($\bar{X}$= 4.28, S.D. = 1.00) were high.

When looking into each main model and sub model, we found that teacher development by transitional model with coaching and mentoring model appropriateness ($\bar{X}$= 4.75, S.D. = 0.44) and feasibility ($\bar{X}$= 4.80, S.D. = 0.41) were very high; teacher development by transitional model with community of practice appropriateness ($\bar{X}$= 4.60, S.D. = 0.60) and feasibility ($\bar{X}$= 4.70, S.D. = 0.57) were very high as well. Teacher development by transformative model with action research appropriateness ($\bar{X}$= 4.55, S.D. = 0.60) and feasibility ($\bar{X}$= 4.50, S.D. = 0.69) were very high, while teacher development by transformative model with transformative model appropriateness ($\bar{X}$= 4.35, S.D. = 0.99) and feasibility ($\bar{X}$= 4.30, S.D. = 0.98) were high.

Looking into technological pedagogical content knowledge, it is found that technological pedagogical content knowledge appropriateness ($\bar{X}$= 4.80, S.D. = 0.41) and feasibility ($\bar{X}$= 4.75, S.D. = 0.55) were very high, as well as pedagogical content knowledge appropriateness ($\bar{X}$= 4.70, S.D. = 0.47) and feasibility ($\bar{X}$= 4.70, S.D. = 0.47) were also very high. Technological content knowledge appropriateness ($\bar{X}$= 4.65, S.D. = 0.59) and feasibility ($\bar{X}$= 4.70, S.D. = 0.57) were very high, and technological

pedagogical knowledge appropriateness ($\bar{X}$= 4.65, S.D. = 0.59) and feasibility ($\bar{X}$= 4.65, S.D. = 0.59) were very high.

Productive pedagogies have two aspects, the first one is intellectual quality. In this aspect, we found that deep knowledge has very high appropriateness ($\bar{X}$= 4.50, S.D. = 0.76) and high feasibility ($\bar{X}$= 4.25, S.D. = 1.07), followed by knowledge problematic, which has high appropriateness ($\bar{X}$ = 4.30, S.D. = 0.86) and high feasibility ($\bar{X}$= 4.10, S.D. = 1.17); metalanguage appropriateness ($\bar{X}$= 4.20, S.D. = 0.77) and feasibility ($\bar{X}$= 4.00, S.D. = 1.08) were high as well.

In addition, supportive classroom environment aspect found that student control appropriateness ($\bar{X}$= 4.70, S.D. = 0.47) and feasibility ($\bar{X}$= 4.55, S.D. = 0.76) were both very high. Self-regulation appropriateness ($\bar{X}$= 4.60, S.D. = 0.50) was very high , and feasibility ($\bar{X}$= 4.40, S.D. = 1.04) was high; engagement appropriateness ($\bar{X}$= 4.60, S.D. = 0.68) was very high, and feasibility ($\bar{X}$= 4.40, S.D. = 0.88) was high.

Experts' evaluation on the appropriateness of the graphic design of private school teacher development model "ACCT teacher development model" (1st draft)

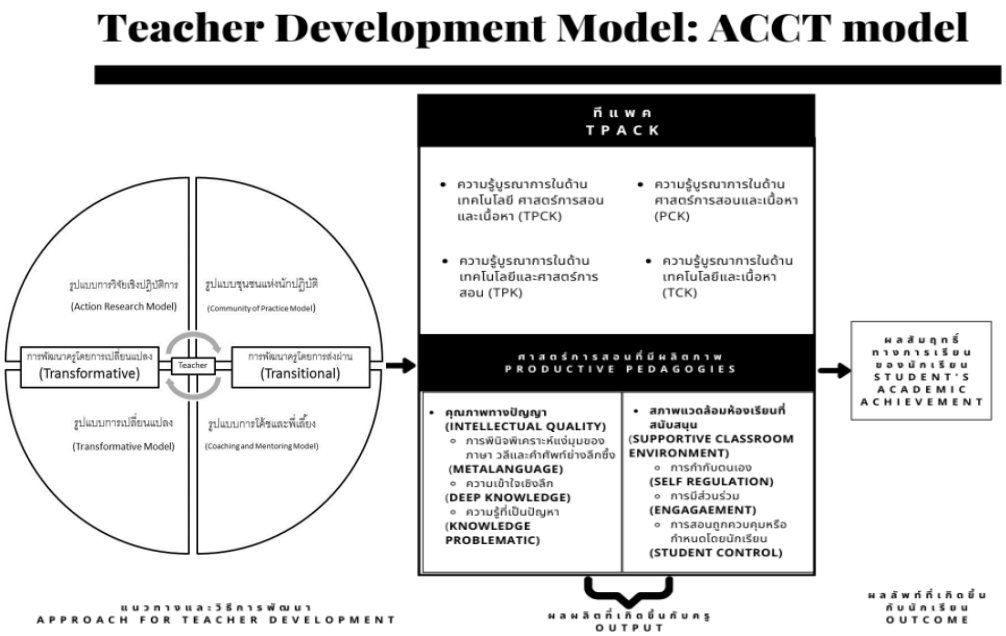

Figure 7 shows ACCT teacher development model (1st draft)

Table 39 Evaluation result of appropriateness of the graphic presentation of private school teacher development model "ACCT teacher development model" (1st draft) by experts

Graphic design of ACCT teacher development model	Experts' evaluation
Appropriate	17
Needs adjustment	3
Inappropriate	-
Total	20

From table 39 we can see that 17 experts have evaluated that the graphic design of the model is appropriate and usable. There were some suggestions that the researcher should put the details on process of each development model in the design; the researcher should consider putting TPACK and productive pedagogies in the same box if they are both outputs. The researcher considered all the information and consulted with advisors to develop the second draft of the model.

4.5 Out-of-field teacher development model "ACCT teacher development model" (2nd draft)

From the evaluation of private school teacher development model "ACCT teacher development model" (1st draft), the researcher then revised the model according to the experts' comments mentioned in the previous section.

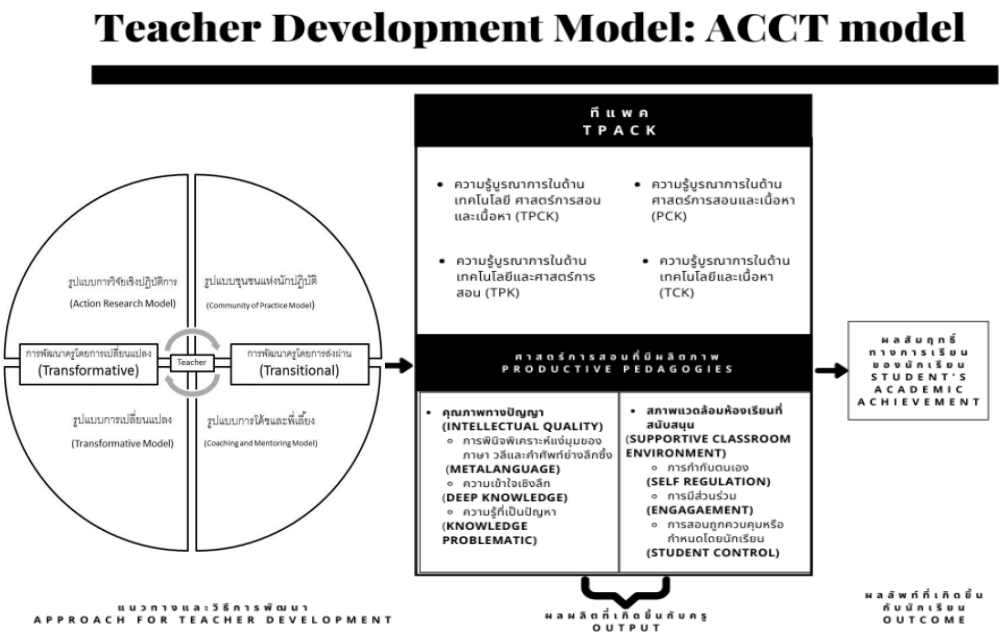

Figure 8 shows ACCT teacher development model (2nd draft)

The researcher conducted a focus group with 12 experts to verify the appropriateness and feasibility of (2nd draft) ACCT teacher development model.

Table 40 Summary of focus group experts' comments on of private school teacher development model "ACCT teacher development model" (2nd draft)

Components of private school teacher development model "ACCT teacher development model"	Experts' comments
1. Model Title in Thai	-
2. Model Title in English	- The abbreviation of the model ACCT should follow PNI values ACTC instead of ACCT. - The name only focuses on the model, still lack of the meaning from TPACK and productive pedagogies.
3. Importance of teacher development model	- Where does the researcher get the PNI values from? – Need to clarify the research population and sampling, so the user knows that this model is suitable for out-of-field primary and secondary educational levels.
4. Teacher development model objectives	- The third objective may not be able to achieve; the focus of this model is on out-of-field teachers, not students. - The first objective should state Thai out-of-field teachers not just out-of-field teachers.
5. Teacher development model main characteristics	- Clearer definition on the model; we need to know to put each development model into practice.
6. Implementation of teacher development model	- The school wants to know each step of how to implement the model.
7. Measurement and evaluation of teacher development model	- The evaluation of teacher pedagogies practice should use classroom observation and lesson plan.
8. Graphic design on the development model	- The graphic should add one more box on the left about out-of-field teachers. Right now, it still lacks the essence of out-of-field teachers.

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4.6 Out-of-Field Teacher Development Model "TPACK & Productive pedagogical Transformative Model" (final)

From the focus group discussion, the researcher summarised the comments from the 12 experts - 3 from educational administration field, 3 from school administration field, 2 from teacher development field, and 4 from pedagogy field. The researcher showed the results from each component and consulted with the

advisor to revise the 2nd draft model to finalise the final out-of-field teacher develop model. The researcher and advisor came up with the implemented version of out-of-field teacher development model called " TPACK & Productive Pedagogical Transformation Model". These are the details of the final draft "TPACK & Productive Pedagogical Transformation Model".

1) Teacher Development Model Title: TPACK & Productive Pedagogical Transformative Model

2) Importance of Teacher Development Model

The effectiveness of administrators is a key to drive organisations or schools. Superintendents, principals, and others with authority in school systems are instrumental in providing the vision, time, and resources to support continual professional learning, a positive school climate, and success for all students. Administrators are in charge and responsible for planning resources such as man, money, materials and methods to bring out an effective organization or school. One of the important resources in all organizations is man or employees; in school context, it is teachers. School administrators have to support and enhance teachers' knowledge, capability, skills etc. so they can bring success for all students.

In this case, we will focus on an area of out-of-field teacher development. According to Hobbs (2012), school administrators need to consider the school context, school support and development plans, and teachers' prior knowledge and relating knowledge to out-of-field teachers in developing a professional development program for out-of-field teachers. She further explains that there is still a lack of understanding of the significance of out-of-field teaching experiences and it is an international concern to perceive that it is acceptable to put out-of-field teachers to positions out of their field. From the statements, we can see that there are special characteristics of out-of-field teachers and it is the reason why we need to pay attention to this.

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Specifically, in Thailand where we have many "out-of-field" teachers, we need to make sure that they feel confident in teaching and support them on their teaching practice. According to Prahakul and Traiwichikhun (2016), it is found that 59.4 % of Thai teachers who are working under the Office of Primary Education Service Areas have been assigned to teach out-of-field and there is a significant impact on student's academic achievement comparing to in-field teachers. While a lack of qualify teachers causes the school to put teacher out-of-field, private schools in Thailand can hire a person who does not have a degree in education to teach in schools through a temporary teaching license (Kurusapha, 2014). This means all private schools in Thailand can hire a person who does not have educational degrees. As mentioned earlier, there is a significant difference between in-field and out-of-field teacher quality; it is urging us to look into ways to develop teachers who are out-of-field, especially those who are working in private schools. Some out-of-field teachers are assigned to positions for which they are not suitably qualified. One way to support

them is through professional development. Teachers who go through a professional development program will be equipped with capability to teach and ways to raise students' achievement.

However, there are many factors that contribute to a student's achievement, including individual characteristics, family, and community, for example. But research suggests that, among school-related factors, teachers matter most. When it comes to student performance, teachers estimated to have two to three times in comparison with the impact of any other school factors, including services, facilities, and even leadership. (McCaffrey, Lockwood, Koretz, & Hamilton, 2003; Rowan, Correnti & Miller, 2002; Rivkin, Hanushek, & Kain, 2000) As we can see, school administrators are key people to drive schools and are those who bring success for all stakeholders including teachers, students, parents, and ultimately society.

In order to finalise the final model that schools should use to develop out-of-field teachers, the research studies the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies. The researcher sent out questionnaires to 326 private schools around Thailand focusing on primary and secondary levels. The informants were school administrators and out-of-field teachers. From the data gathered we then performed an analysis of Modified priority needs index of teacher development model. We found 4 models that have higher priority needs than average (Mean PNI=0.141), which are the action research model (PNI= 0.180), the community of practice (PNI= 0.167), the transformative model (PNI=0.148), and the coaching and mentoring model (PNI=0.142).

For the analysis of modified priority needs index of productive pedagogies we found two aspects that have higher mean than average (Mean PNI= 0.141), which are intellectual quality (PNI= 0.152) and supportive classroom environment (PNI=0.142). When we considered each item of intellectual quality aspect, we found that metalanguage (PNI=0.183), deep knowledge (PNI=0.158), and knowledge problematic (PNI= 0.154) have modified priority need index higher than average. For supportive classroom environment aspect, we found that self-regulation (PNI= 0.153), engagement (PNI=0.152), and student control (PNI=0.143) have modified priority needs index higher than average.

For the analysis of modified priority needs index of technological pedagogical content knowledge we found four types of knowledge that have higher mean than average (Mean PNI= 0.143). These are technological pedagogical content knowledge (PNI= 0.157), technological pedagogical knowledge (PNI= 0.156), technological content knowledge (PNI= 0.155), and pedagogical content knowledge (PNI=0.143).

From the analysis of modified priority needs index we can design private school teacher development model based on the concepts of TPACK and productive pedagogies.

3) Objectives of teacher development model

3. 1) To develop private school out-of-field teachers with transitional and transformative teacher development models

3. 2) To develop private school out-of-field teachers on technological pedagogical content knowledge and productive pedagogies

3.3) To develop private school out-of-field teachers teaching in order to elevate student's academic achievement

4) Teacher development model main characteristics

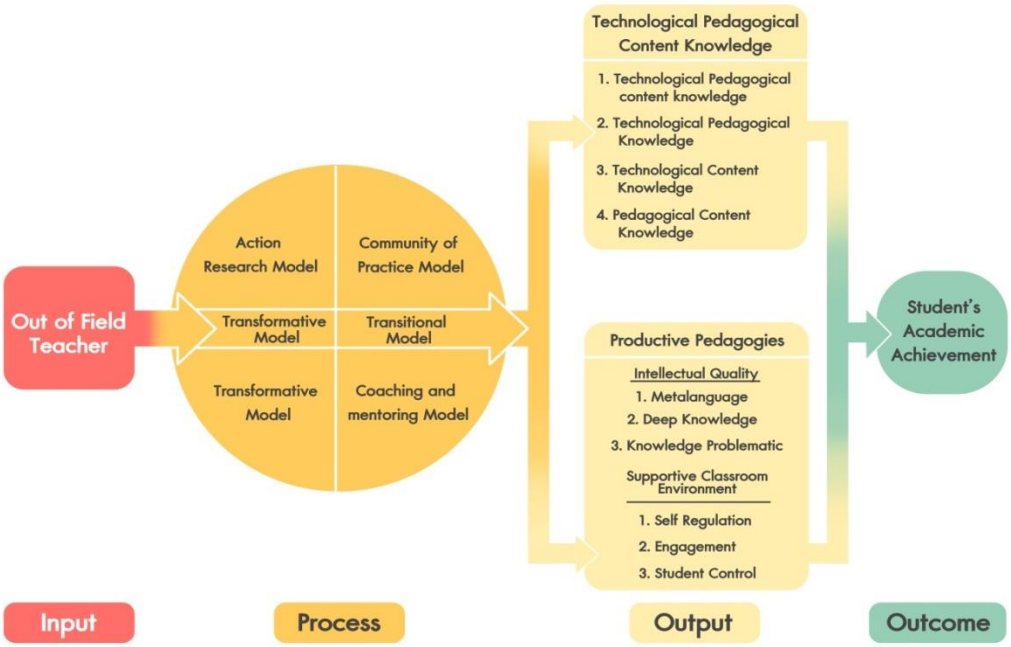

Figure 9 show TPACK & Productive Pedagogical Transformation Model (Final)

4.1) Out-of-field Teachers: The need analysis of out of field teachers must be studied before implementing into teacher development models. In this model, out-of-field teachers are teachers who are currently teaching outside of their subject or teachers who didn't graduate with educational background.

4.2) Main model for teacher development: There are 2 main models for developing teachers. The first one is transitional model; the main characteristic of this model is that it relies on both experts and community as a knowledge platform and community of practice. It reflects the reflective dialogue where constant feedback is an ongoing process. While certain level of autonomy depends on the role of the participants. While transformative model suggests strong links between theory and practice, internalisation of concepts, reflection, construction of new knowledge and its application in different situations, and an awareness of the professional and political

context. Transformative models of CPD have the capacity to support considerable professional autonomy at both individual and profession-wide levels. There are two development models in each model as follows:

Teacher development models in transitional models

1) Teacher development in transitional model by community of practice model: The development of teachers through community of practice by engagement of teachers in school to plan the learning together and share knowledge, and experience on teaching practice. The community is central to the internalisation of professional development.

2) Teacher development in transitional model by coaching and mentoring model: The development of teacher through coaching and mentoring between the experienced teachers and out-of-field teachers is usually a one-to-one relationship, generally between two teachers sharing and consulting one another on teaching practice.

Teacher development in transformative model

1) Teacher development in transformative model by action research model: The development of teachers through the mean of doing action research as a process of teacher development. The teachers learn how to gather data in order to reflect from their classroom practice with the professional groups in school to learn and relearn by the means of action research.

2) Teacher development in transformative model by transformative model: The development of teachers to transform teachers to an in-field teacher capable of teaching proficiently that supports educational change. In this development, it involves the combination of a number of processes and conditions – aspects of which are drawn from the evaluation of outputs (Technological pedagogical content knowledge and Productive pedagogies). Then retrain the teachers by the process of community of practice, coaching and mentoring, and action research again; in this loop the transformative model represents continuity of transforming change in teachers. The central characteristic is the combination of practices and conditions that support a transformative agenda.

4.3) Output of teacher development: Technological pedagogical content knowledge and productive pedagogies

TPACK refers to the complex interplay of three primary forms of knowledge, which are technological knowledge, pedagogical knowledge and content knowledge. And productive pedagogies are the twenty productive pedagogies under the four dimensions that are constructed in the productive pedagogies classroom reflection manual, as a guide from Queensland education, to provide an index of quality teaching and students' learning and to be used to help teachers to reflect on their classroom practices and generating professional development dialogue.

Technological pedagogical content knowledge for this teacher development model (final)

1) Pedagogical Content Knowledge (PCK) refers to knowledge of pedagogy that is applicable to the teaching of specific content. It is the notion of the transformation of the subject matter for teaching.

2) Technological Content Knowledge (TCK) refers to an understanding of the manner in which technology and content influence and constrain one another.

3) Technological Pedagogical Knowledge (TPK) refers to an understanding of how teaching and learning can change when particular technologies are used in particular ways.

4) Technological Pedagogical Content Knowledge (TPACK) refers to a deeply skilled teaching with technology. It is the basis of effective teaching with technology, requiring an understanding of the presentation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help address some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones.

Productive pedagogies for this teacher development model (final)

Productive pedagogies express the meaning and value of what "quality teaching" might look like and provide a descriptive language to support and engage teachers with sustained professional dialogue about their practices and performances These two dimensions can provide teachers with a snapshot of their classroom practices that should be present to ensure that the intellectual and social outcomes of all students are improved.

Intellectual quality: Deep knowledge (Does the lesson cover operational fields in any depth, detail or level of specificity?), Knowledge problematic (Are students critically examining texts, ideas and knowledge?), Metalanguage (Are aspects of language, grammar and technical vocabulary being given prominence?).

Supportive classroom environment: Student control (Do students determine specific activities or outcomes of the lesson?), Engagement (Are students engaged and on-task during the lesson?), and Self-regulation (Is the direction of student behavior implicit and self-regulatory?).

4.4) Outcome: To elevate student's academic achievement

5) Implementation of teacher development model

The researcher developed Acct teacher development model for private school out-of-field teachers so that they can teach effectively and able to raise student's achievement. School administrators should study teacher development model

main characteristics and imply the model according to the school context. These are steps in implementing TPACK & Productive Pedagogical Transformation Model:

5.1) School administrators must realise and see the importance of out-of-field teachers and participate in the development of out-of-field teachers to raise student's academic achievement.

5.2) School administrators must conduct a need analysis of out-of-field teachers and analyse it to assess the teacher subject knowledge, pedagogical knowledge, and technological knowledge.

5.3) School administrators and teachers must decide and agree on the development models that are most suitable to the development topics.

5.4) School administrators and teachers make a decision on development models that best suit their school context.

5.5) School administrators and teachers make a decision on knowledge to develop for out-of-field teachers that are able to bring out student's achievement.

5.6) Teachers must participate in the exchange of knowledge on technological pedagogical content knowledge and productive pedagogies.

5.7) School administrators' role is to learn and be a mediator in the development process and support each teacher.

5.8) Educational personnel in school should participate in the development in order to understand the needs of out-of-field teachers and better support them.

5.9) Schools need to have a system that can track each student's academic performance and reflect the information of student's success factors on technological pedagogical content knowledge and productive pedagogies to out-of-field teachers; these success factors can also be shared with the public or community.

5.10) The school evaluate teacher's performance and knowledge then repeat the steps to continue develop and transform teachers (Transformative model).

6) Measurement and evaluation of teacher development model

6.1) Measure and evaluate teacher's satisfaction towards professional development by using satisfaction form.

6.2) Measure and evaluate teacher's knowledge on TPACK by using open-ended tests.

6.3) Measure and evaluate teacher's knowledge on productive pedagogies by checking through lesson plans and observe classroom with checklist.

6.4) Measure and evaluate student's academic achievement by comparing student's national test results.

CHAPTER 5
RESEARCH SUMMARY, DISCUSSIONS, AND RECOMMENDATIONS

This chapter presents a summary of the research, the discussions and recommendations for further studies.

The objectives of this research were 1) to study conceptual framework of teacher development, TPACK, and productive pedagogies 2) to study the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies 3) to develop a private school teacher development model based on the concepts of TPACK and productive pedagogies. The population in this research is 3,776 schools under the Office of Private Educational Commission, the Ministry of Education. The informants in this research are 352 administrators and 352 out-of-field teachers at the Office of Private Education Commission. The esearch instruments are conceptual evaluation form, questionnaires on the current and desirable states of private school teacher development based on the concepts of TPACK and productive pedagogies, and model evaluation form. For data analysis, frequency, percentage, means, standard deviation, $PNI_{modified}$, and content analysis for quantitative part. The details of the analysis are as follows.

5.1 Summary

5.1.1 The conceptual framework for private school teacher development model based on the concepts of TPACK and productive pedagogies

The conceptual framework of this study was private school teacher development model based on the concepts of TPACK and productive pedagogies. There were three main areas; teacher development model, technological pedagogical content knowledge, and productive pedagogies. The overall congruency reported by 4 experts were suitable. The details of the conceptual framework are as follows:

1) Teacher development model consist of 3 main models and 9 sub models

Transmission models: the training model, the award-bearing model, the deficit model, and the cascade model

Transitional models: the standard-based model, the coaching and mentoring model, the community of practice model

Transformative models: the action research model, and the transformative model

2) Technological pedagogical content knowledge consists of 7 types of knowledge which are content knowledge, pedagogical knowledge, technological

knowledge, pedagogical content knowledge, technological content knowledge, technological pedagogical knowledge, and technological pedagogical content knowledge.

3) Productive pedagogies consist of 4 dimensions and 20 items.

Intellectual quality: Higher order thinking, Deep knowledge, Deep understanding, Substantive conversation, Knowledge problematic, Metalanguage.

Connectedness: Knowledge integration, Background knowledge, Connectedness to the world, Problem-based curriculum.

Supportive classroom environment: Student control, Social support, Engagement, Explicit criteria, Self-regulation.

Recognition of difference: Cultural knowledge, Inclusivity, Narrative, Group identity, Citizenship

5.1.2 Current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies

Out-of-field Teachers in Thailand Private Schools

From the research results of 163 schools, we found that there are 6,012 teachers. Out-of-field teachers accumulated to 2,749 teachers or 45.70%, which is almost half of the total number of teachers.

School Sizes

When comparing to school sizes, we found that large schools have the most out-of- field teachers of 1,070, followed by extra-large schools with 989 out-of-field teachers, medium-sized school with 628 out-of-field teachers, and small schools with 62 out-of-field teachers. While looking at the percentages of out-of-field teachers of each school size as compared to the in-field teachers, we found that small schools have the highest percentage of out-of-field teachers (80.5%), followed by medium-sized schools (56.00%), large schools (46.60%), and extra large schools (39.30%) respectively.

Geographical Location

If we compare geographical location of schools, we can see that central area has the highest number of out-of-field teachers, that is 1,308, followed by southern area with 782 out -of-field teachers, northeastern area with 374 out-of-field teachers, and northern area with 285 out-of-field teachers. While looking at the percentage of out-of-field teachers as compared to the total number of teachers in each area, we found that southern area has the highest percentage of out-of-field teachers, 51.40, followed by central area, 47.60, northeastern area, 43.40, and northern area, 32.30.

Educational Levels

Looking at educational levels, we found that kindergarten 1 to primary 6 has the highest number of out-of-field teachers 847, followed by kindergarten 1 to secondary 6 with 814 out-of-field teachers, kindergarten 1 to secondary 3 with 497 out-of-field teachers, pre-kindergarten to primary 6 with 455 out-of-field teachers, pre-kindergarten to secondary 3 with 115 out-of-field teachers, and primary 1 to secondary

6 with 21 out-of-field teachers. While looking at the percentage of out-of-field teachers as compared to the total number of teachers in each educational level, we found that pre-kindergarten to primary 6 has the highest percentage of out-of-field teachers, 72.92, followed by kindergarten to primary 6 at 56.92 percent, kindergarten 1 to secondary 3 at 45.18 percent, pre-kindergarten to secondary 3 at 39.38 percent, kindergarten 1 to secondary 6 at 34.67 percent, and primary 1 to secondary 6 at 13.13 percent

Out-of-field teaching levels and school sizes

We found that most out-of-field teachers teach primary 1 to 6 in medium-sized schools, followed by primary 1 to 6 in large schools. The majority of out-of-field teachers are in medium-sized schools and teach primary 1 to 6.

Out-of-field teaching subjects and school sizes

We found that Mathematics has the most out-of-field teachers teaching the subjects, followed by Thai language, Social studies, Religion and Culture, and English. When looking at the school sizes, we found that medium-sized schools have the most out-of-field teachers teaching the subjects, followed by large, extra large, and small schools.

Current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies

The overall current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies suggest the mean of the current states at a high level and the mean of the desirable states at high level. Moreover, the overall current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in productive pedagogies suggest the mean of the current states at a high level and the mean of the desirable states at a high level. In addition, the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies in technological pedagogical content knowledge suggest the mean of the current states at a high level and the mean of the desirable states at a high level.

We can categorise the current and desirable states into 3 areas for a closer look as follows:

Teacher Development Model

With respect to the current state, the findings suggest a high level of transmission model in developing teachers on technological pedagogical content knowledge and productive pedagogies with the mean at a high level. When considering each model in transmission model, we found that the training model has the highest mean at a high level, followed by the standard-based model with the mean at a high level.

Next, the findings suggest a high level of the transitional model in developing teachers on technological pedagogical content knowledge and productive

pedagogies, which ranks second with the mean at a high level. When considering each model in transitional model, we found that the coaching and mentoring model has the highest mean at a high level, followed by the community of practice model with the mean at a high level.

Lastly, as for the lowest ranking among all models, the findings suggest a high level of the transformative model in developing teachers on technological pedagogical content knowledge and productive pedagogies in transformative model with the mean at a high level. When considering each model in transformative model, we found that the transformative model has the highest mean at a high level, followed by the action research model with the mean at a high level.

For the desirable states, the findings suggest a high level of transmission model in developing teachers on technological pedagogical content knowledge and productive pedagogies, which ranks first with the mean at a high level. When considering each item in transmission model, we found that the standard-based model has the highest mean at a high level, followed by the cascade model with the mean at high level.

Next, the findings suggest a high level of transformative model in developing teachers on technological pedagogical content knowledge and productive pedagogies, which ranks second with the mean at a high level. When considering each model in transformative model, we found that the transformative model has the highest mean at a high level, followed by the action research model with the mean at a high level.

Lastly, as for the lowest ranking among all models, the findings suggest a high level of transitional model in developing teachers on technological pedagogical content knowledge and productive pedagogies with the mean at a high level. When considering each model in transitional model, we found that the coaching and mentoring model has the highest mean at a high level, followed by the community of practice model with the mean at a high level.

Productive Pedagogies

With respect to the current states, the findings suggest a high level of the teacher development model in developing teachers on productive pedagogies in recognition of difference aspect, which ranks first with the mean at a high level. When considering each item in recognition of difference aspect, we found that inclusivity has the highest mean at a high level, followed by citizenship with the mean at a high level.

Next, the findings also suggest a high level of teacher development model in developing teachers on productive pedagogies in connectedness aspect, which ranks second with the mean at a high level. When considering each item in connectedness aspect, we found that background knowledge has the highest mean at a high level, followed by knowledge integration with the mean at a high level.

Lastly, as for the lowest ranking among all aspects, the findings suggest a moderate level of teacher development model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a moderate level. When considering each item in intellectual quality aspect, we found that substantive

conversation has the highest mean at a high level as well as deep understanding, followed by higher order thinking with the mean at a high level.

For the desirable states, the findings suggest a high level of teacher development model in developing teachers on productive pedagogies in recognition of difference aspect, which ranks first with the mean at a high level. When considering each item in recognition of difference aspect, we found that inclusivity has the highest mean at a high level as well as citizenship, followed by cultural knowledge with the mean at a high level.

Next, the findings also suggest a high level of the teacher development model in developing teachers on productive pedagogies in connectedness aspect, which ranks second with the mean at a high level. When considering each item in connectedness aspect, we found that background knowledge has the highest mean at a high level, followed by connectedness to the world with the mean at a high level.

Lastly, as for the lowest ranking in all aspects, the findings suggest a high level of the teacher development model in developing teachers on productive pedagogies in intellectual quality aspect with the mean at a high level. When considering each item in intellectual quality aspect, we found that substantive conversation and deep understanding has the highest mean at a high level, followed by higher order thinking, with the mean at a high level, deep knowledge, and metalanguage.

Technological Pedagogical Content Knowledge

With respect to the current states, the findings suggest a high level of teacher development model in developing teachers on technological pedagogical content knowledge in content knowledge, which ranks first with the mean at a high level, followed by pedagogical knowledge with the mean at a high level. Lastly, the lowest ranking among all aspects is technological pedagogical content knowledge with the mean at a high level.

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For the desirable states, the findings suggest a high level of teacher development model in developing teachers on technological pedagogical content knowledge in content knowledge, pedagogical knowledge and technological knowledge, which rank first with the mean at high level, followed by pedagogical content knowledge. While the lowest are technological content knowledge, technological pedagogical knowledge, and technological pedagogical content knowledge with the mean at a high level.

5.1.3 Priority needs index, strength, and weakness of private school teacher development model based on the concepts of TPACK and productive pedagogies

From the analysis of priority needs index, strength, and weakness, it is found that the overall modified priority needs index of private school teacher development based on the concepts of TPACK and productive pedagogies is categorised as a strength. We will look into the3 areas for deeper understanding.

Teacher Development Model

Analysed by development models, the priority need models are the action research model, the community of practice model, and the transformative model, which are the weakness of private school teacher development model based on the concepts of TPACK and productive pedagogies.

The low priority need models are the coaching and mentoring model, the standard-based model, the cascade model, the deficit model, the award-bearing model, and the training model, which are the strength of private school teacher development model based on the concepts of TPACK and productive pedagogies.

Productive Pedagogies

The overall modified priority needs index of private school teacher development based on the concepts of TPACK and productive pedagogies in productive pedagogies aspect is categorised as a strength of productive pedagogies aspect in private school teacher development model.

Analysed by overall productive pedagogies aspect, the high priority need aspect is supportive classroom environment, which is the weakness of productive pedagogies.

The low priority need productive pedagogies are intellectual quality, connectedness, and recognition of difference, which are the strength of productive pedagogies.

When considering each item in intellectual quality aspect of productive pedagogies, we found the high priority need is metalanguage, which is the weakness of intellectual quality aspect. While the low priority needs are higher order thinking, deep knowledge, deep understanding, substantive conversation, and knowledge problematic; these are the strength of productive pedagogies.

For connectedness aspect of productive pedagogies, the high priority needs are connectedness to the world, and problem-based curriculum, which are the weakness of connectedness aspect. The low priority needs are knowledge integration, and background knowledge, which are the strength of connectedness aspect.

Supportive classroom environment aspect of high priority needs are student control, engagement, and self-regulation, which are the weakness of supportive classroom environment aspect. For the low priority needs, there are social support, and explicit criteria, which are the strength of supportive classroom environment aspect.

Lastly, recognition of difference aspect of high priority need items are narrative, and group identity, which are the weakness in recognition of difference aspect. For the low priority needs, there are cultural knowledge, inclusivity, and citizenship, which are the strength of recognition of difference aspect.

Technological Pedagogical Content Knowledge

We found that the overall modified priority needs index of private school teacher development based on the concepts of TPACK and productive pedagogies in technological pedagogical content knowledge lies in the weakness area.

Analysing the data, we found the high priority needs are pedagogical content knowledge, technological content knowledge, technological pedagogical knowledge,

and technological pedagogical content knowledge, which are the weakness in technological pedagogical content knowledge.

The low priority needs are content knowledge, pedagogical knowledge, and technological knowledge, which are the strength of technological pedagogical content knowledge.

5.1.4 TPACK & Productive Pedagogical Transformative Model

TPACK & Productive Pedagogical Transformative Model was developed from the research topic on private school teacher development model based on the concepts of TPACK and productive pedagogies. The researcher used the data obtained from current and desirable states, priority needs index, strength, and weakness of private school teacher development model based on the concept of TPACK and productive pedagogies as well as information from experts analysis of the 1st draft of the development model and the focus group comments on the 2nd draft to develop the model. There are 4 areas of the model which are explained below.

The objective of the model is to transform out-of-field teachers to be able to teach with the knowledge of technological pedagogical content knowledge, put productive pedagogies into practice and to be able to teach effectively which result in higher student's academic achievement. There are 4 components of TPACK & Productive Pedagogical Transformative Model, which are 1) Out-of-field teachers (Input), 2) Development models (process), 3) Technological pedagogical content knowledge and productive pedagogies (Output), and student's academic achievement (Outcome).

5.2 Discussion of the Study

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5.2.1 The conceptual framework for private school teacher development model based on the concepts of TPACK and productive pedagogies

From the research results, we found 3 components of private school teacher development model based on the concepts of TPACK and productive pedagogies to be appropriate for the research. The components are 1) teacher development model, 2) productive pedagogies, and 3) technological pedagogical content knowledge.

1) Teacher Development Model

At the heart of professional development, teacher professional development model is the component that decides how the teacher's learning is going to process and which knowledge is suitable to the characteristics of these models. As school administrators, we need to know who our teachers are and how we are going to develop them based on these models. We need to know what the teachers' needs are and we need to fulfil their needs to the most, which in turn improves the quality of teaching and thus student's performance. From the study of 3 main models and 9 sub models of continuing professional development namely transmission model

(consisted of the training model, the award-bearing model, the deficit model, the cascade model, the and standard-based model), transitional model (consisted of the coaching and mentoring model ,and the community of practice model), and transformative model (consisted of the action research model, and the transformative model), it can help guide and decide the best way to deliver teacher's learning. School administrators must focus on developing teacher capabilities rather than focusing on their limitations; it may be a long road to see the outcome and need a strong support from school administrators (Leithwood, Seashore Louis, Anderson, and Wahlstrom, 2004; Alliance for Excellent Education, 2011; Beltman, Mansfield, and Price, 2011). However, from the study of Komba & Nkumbi (2008) teachers view that professional development is important because it improves the teachers professionally, academically, and technically. Knowing which models are best to help our teachers, we can better develop and help them successfully eventually.

2) Productive Pedagogies

There are many pedagogies around the world namely multiple intelligence, student's centre, differentiated instruction, student-centred learning etc. Pedagogy means the study of the methods and activities of teaching (Pedagogy, 2020). However, productive pedagogies framework is a framework that is designed based on authentic pedagogy. Authentic pedagogy is a pedagogy that leads to higher student's intellectual outcomes. The concept productive is an indication of learning outcomes in the classrooms and pedagogies is the description of the classroom practice. Productive pedagogies framework thus focusing on improving student's academic and social outcomes (Hayes et al. 2006; Lingard, 2005). Therefore, it is an indication of the classroom practice that schools must develop the teachers so that the student's academic achievement may be higher. There are four aspects in productive pedagogies, which are intellectual quality, connectedness, supportive classroom environment, and recognition of difference. Each aspect focuses on different dimensions of teaching practice; there are 19 items for all four aspects as an indicator of classroom practice. In this research, we focus on developing out-of-field teachers based on productive pedagogies because our ultimate goal is to raise student's achievement by out-of-field teachers.

3) Technological Pedagogical Content Knowledge

Teacher's knowledge has been debated for decades for what it is and what teachers must learn to be able to teach students. As an educator, administrator, or designer of professional development programme for teachers in this age, we also need to think about technology. Technology has played an important part where there are many learning platforms online. In the longer run, exposure to technology can contribute to the skills that children will need for jobs in the future. Even children without previous experience using mobile devices can quickly pick up the skills needed to play learning games (Grace & Kenny, 2003; Kim et al., 2012). The knowledge of technology has been introduced to teacher's knowledge for a while now

apart from content knowledge and pedagogy knowledge. If we are talking about teacher's knowledge, we are not talking about just content, pedagogical, or technological knowledge separately; we are talking about an integration of these knowledge and how do we develop teachers to be able to integrate these bodies of knowledge into their practice.

5.2.2 Out-of-field teachers in Thailand private schools

From the findings, the results suggest that almost half of the total number of teachers are out-of-field teachers. The highest proportions of out-of-field teachers lie in small and medium-sized schools in southern and central areas of Thailand. This is because small schools usually have fewer resources and that includes teachers. As a result, smaller schools may find it difficult to find qualified teachers and thus smaller schools tend to have more out-of-field teachers (Ingersoll, 2002). From the results, out-of-field teachers mostly teach in primary 1 to 6 educational levels in mathematics, Thai language, Social studies, Religion and Culture, and English. These findings align with the research, which showed major teacher shortage in key subjects in Thailand, especially foreign language, mathematics, and science (OEC, 2007) and in Australia a research on teacher shortage also reported a low supply of mathematics teacher (Vale, 2010). Another point of concern is that primary 1 to 6 is a compulsory education in Thailand; all children must attend schools; therefore, there are more teachers needed to attend to this need (Ministry of Education, 2008). To develop out-of-field teachers effectively, we need to learn about the characteristics of out-of-field teachers, such as geographical locations, school sizes, and teacher allotment as well (Hobb, 2012).

5.2.2 Priority needs, strengths, weaknesses, and current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies

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Chulalongkorn University

1) Teacher Development Model

With respect to the current state and desirable states, the findings suggest a high level of transmission model in developing teachers on technological pedagogical content knowledge and productive pedagogies with the mean at a high level. The transmission model refers to a characteristic of development model that relies on direct teaching. From the study, we found that the training, cascade, and standard-based models have the highest mean. This tells us that private school teacher development in Thailand is mostly using the direct teaching method in developing teachers. It is generally 'delivered' to the teacher by an 'expert', with the agenda determined by the deliverer, and the participant placed in a passive role (Little, 1994; Kelly & McDiarmid, 2002). The priority needs also tell us that there is low need to develop out-of-field teachers with transmission models, as the results show a low priority need.

Now the results from the analysis show a trend moving towards a more engaged way of teacher development in transitional model, which we can see that there is a high level of current and desirable states and a high priority needs index for community of practice model and coaching and mentoring model to develop out-of-field teachers. The community of practice lies in the weakness area while coaching and mentoring lies in the strength area. Transitional model relies on learning in the school as a mean for developing teacher's knowledge. From the characteristics of these two models we can conclude that out-of-field teacher professional development may rely on the experienced teachers in school to share knowledge and enable out-of-field teachers to gain knowledge in the content, pedagogies, and technology (Lieberman, 1996).

Looking at the transformative model, we found a moderate level of the current practice, while the desirable practice is high, but lowest comparing to the two models above. However, there is a high priority need for two models under transformative model, which are action research and transformative model. Action research has the highest priority need out of all the models followed by transformative model. This means that out-of-field teachers or school administrators see the need to develop teachers through action research and transformative model. This is supported by Shrki and Lavy (2012) that development programmes that stimulate and support teachers to analyse and reflect on the reasoning behind what they do in their classrooms are beneficial (Shriki & Lavy, 2012) The characteristic of the models relies heavily on the learning process in school context as well as outside of school context. Teacher development that are based on the practice of teachers while developing the knowledge that is applicable will be effective in developing teachers. (Dyer et al., 2004). These two development models give the teachers autonomy for their choice of development, which they think it is most applicable to their context, which they think it will help to better develop their needs.

2) Productive Pedagogies

From the research analysis, we found that the overall current practice and desirable states of productive pedagogies are high and the current and desirable practices are the same in the ranking for productive pedagogies aspects as follows:

The highest current and desirable states aspect in productive pedagogies is recognition of difference and it lies in the low priority need area, which is the strength of teacher development. The results mean that administrators and out-of-field teachers reported a high practice in this aspect as it lies in the strength area. There may be changes and no changes if we are to develop out-of-field teachers in this aspect because the practice is already high enough. Recognition of difference is about teachers giving equal rights to individuals as well as groups and giving importance to different cultures equally in their teaching practice. The results also show a need to develop teachers on narrative and group identity items which fall into the weakness area. This means that in these two items teachers need to build a strong sense of group identity and teach in a much more narrative way in which the teachers can make a

connection of contents. Narrative as strategy in teaching has shown a change in student's perspective to learning and broaden the student's current perspective and increase critical thinking and reflection while the study of racial ethnic identity (REI) found that youth in REI connectedness attained better grade point average (Altschul, I., Oyserman, D. & Bybee, D., 2006; Butcher, S., 2006)

Next, the aspect of connectedness also shows a high current and desirable practice but there is a low need in the overall aspect. This means that there is already a high practice in this aspect and there may be a little change to develop teachers according to this aspect. Connectedness is about how teachers can connect knowledge beyond classroom context into the student's background knowledge and experience. When we look into this aspect closely, the connectedness to the world and problem-based curriculum items still remains a weakness which the administrators and out-of-field teachers reported a high need to develop these two items. They may have seen a room for development in how a teacher connects the content to the real world and solve the real-world problems in this part. Learning experiences outside the classroom are forms of experiential learning (Dewey, 1897). These experiences are rooted in the simple principle that "experience is the best teacher." Under this framework, learning outside of the classroom is an active process, wherein students encounter authentic problems, construct novel hypotheses, test for real solutions, and interact with others to make sense of the world around them. This statement supports the nature of connectedness aspect; it gives students a real-life experience which in turn creates authentic learning which results in a deep learning experience.

Now we look at the supportive classroom environment; the results show a high current and desirable practice and there is a high need to develop out-of-field teachers in this aspect. The analysis results show a weakness in this area as well; the three items in supportive classroom environment aspect that show high priority needs index are student control, engagement, and self-regulation. When we talk about supportive classroom environment, we talk about the importance of supporting students by conveying high expectation to students, applying student-centred learning, encouraging student's engagement and self-regulation, and providing feedback with the student's performance. The high priority needs in student's control, engagement, and self-regulation show that out-of-field teachers' current practice is low and a high desirable practice is required by out-of-field teachers. Research suggests that social support from teachers, peers, and parents can promote positive academic outcomes and prevent negative psychological outcomes in adolescents (Wang, Selman, Dishion, & Stormshak, 2010).

The last aspect of productive pedagogies is intellectual quality; the results show a moderate current practice and a high desirable practice. This results in a high priority need for this aspect and a weakness as well. Intellectual quality is necessary for all students to perform well academically because it is an aspect that stresses the importance of understanding, completing a challenging task, and engaging as well as negotiating the understanding of the subject matter (Education Queensland,

2010a, pp. 3-9). Therefore, it is very important to develop teachers on intellectual quality. Looking into each item of intellectual quality aspect, we found a high priority need for metalanguage, which results in a weakness of this aspect. However, deep knowledge and knowledge problematic also report a high priority mean. These three items are what we need to pay close attention to when developing out-of-field teachers to be able to raise higher student's academic achievement.

3) Technological Pedagogical Content Knowledge

From the research analysis, we found that the overall current practice and desirable states of technological pedagogical content knowledge are high. When we look in detail, we found current and desirable practice of content knowledge, pedagogical knowledge, and technological knowledge the highest while pedagogical content knowledge (PCK), technological content knowledge (TCK), technological pedagogical knowledge (TPK), and technological pedagogical content knowledge (TPCK) high, but lower than the three mentioned previously. The weaknesses that we need to develop out-of-field teachers are the integration of knowledge between technological, pedagogical, and content knowledge. The integration knowledge PCK is the teaching and learning that links curriculum, assessment and reporting. TCK is an understanding that which technologies suit the subject matter, while TPK is the understanding that technologies can change the way we teach and learn. Last is TPCK, which means knowledge of how technology can combine pedagogies and contents to make it easier for students to learn and make it easier for teachers to teach in more constructive ways (Koehler & Mishra, 2009). We can see that in private school context, the development of out-of-field teachers still need a way to develop teachers to be able to integrate content, pedagogy, and technology knowledge in their teaching practice. The study shows that professional development that supports teachers in using technology increased students' performance on state tests in grades 3-6, as compared to students taught by teachers who didn't attend the professional development (Meyers and Brandt, 2010).

5.2.3 TPACK & Productive Pedagogical Transformative Model

TPACK & Productive Pedagogies Transformative Model objective was to transform out-of-field teachers to be able to teach with the knowledge of technological pedagogical content knowledge, put productive pedagogies into practice and teach effectively, which result in a higher student's academic achievement. There are 4 components of TPACK & Productive Pedagogical Transformative Model, which are 1) Out-of-field teachers (Input), 2) Development models (Process), 3) Technological pedagogical content knowledge and productive pedagogies (Output), and student's academic achievement (Outcome).

Out-of-Field Teachers (Input) were prioritised first in the model; there are areas about out-of-field teachers that we need to study before implementing professional development. In the proposed model, we need to conduct a need analysis for out-of-filed teachers; we need to know what their needs are. For example, how much do they know regarding content knowledge of the teaching subject, what pedagogical knowledge do they know, or can they integrate the knowledge of pedagogical and content knowledge into practice, etc. These areas are far under research and there is a need to establish a theoretical framework of the complexity of teaching out-of-field (McConney & Price, 2009). This later explained by Hobbs (2012) that there are three factors influencing out-of-field teachers which are the context of school, the support that they get, and the personal knowledge or research that they currently hold. These are areas we need to consider before developing out-of- field teachers.

Teacher Development Models (Process) are divided into 2 main models and 4 sub models. The first one is transitional model, which includes community of practice and coaching and mentoring model. The results show a high priority need for these 2 models in developing out-of-field teachers; the community of practice falls into weakness while coaching and mentoring falls into strength, but both hold a high priority need. These two models have an important characteristic, which is learning from colleagues in the school; the community of practice involves interaction in the community to create what we called planned learning (Wegner, 1998). While coaching and mentoring model involve a one-on-one relationship between teachers, coaching is more of skill based while mentoring involves element of conselling and professional friendship (Rhodes & Beneicke, 2002). These are the reason why these 2 teacher development models have high priority needs. We know that out-of-field teachers need to teach subjects that they are not specialised in and they need to learn this knowledge in the school most of the time. Out-of-field teachers need bridges that assist between in-field and out-of-field space (Star, 1898). This means that colleagues or fellow teachers can be a type of support for out-of-field teachers to teach.

The second is transformative model, which includes action research model and transformative model. The results show the highest priority need for action research and follows by transformative model. These two models fall into the weakness area and hold a high priority need. The action research model and transformative model involve teachers learning in and out of school, while the action research focuses more on the learning from research process, but the transformative model relies on changes in the context and applying a suitable approach. The action research is the study of social situation, involving participants themselves as researchers with a view of improving quality of action (Day, 1999). The action research has a major impact not only the improvement of teaching practices but better student achievements and also increase collaboration among peer teachers and fostering new culture (Vula, 2013). We can see that action research is not just a model that develops out-of-field teachers, but also enable them to raise student's achievement.

On the other hand, the transformation for this model serves as an evaluation point where they feedback and retrain the out-of-field teachers by the means of the 3 models mentioned. Hoban (2002) provides an insightful perspective on transformative development; it is a means of supporting educational change. It is a contextually void and what is really needed is not a wholesale move towards the teacher-centred, context-specific models of CPD, but a better balance between these types of models. Kennedy (2005) supported that it could be argued, then, that the key characteristic of the transformative model is its effective integration of the range of models described above. We live in a world where change occurs so sudden, for example the outbreak of covid-19 pandemic. The model looks into these changes and allows the reevaluation and retraining of the teachers, in this case out-of-field teachers, to cope with changes.

Technological pedagogical content knowledge and productive pedagogies (Output) give a guideline of knowledge and practice needed to develop out-of-field private school teachers in Thailand. The technological pedagogical content knowledge (TPACK) and two aspects of productive pedagogies are intellectual quality and supportive classroom environment.

TPACK is different from knowledge of all three concepts individually, namely content knowledge, pedagogical knowledge, and technololgical knowledge. Instead, TPACK is the basis of effective teaching with technology, requiring an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help address some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones" (Koehler & Mishra, 2009). However, there are concerns about teacher professional development, especially the need to deepen teachers' knowledge of the subjects being taught, while keeping up with developments in digital learning environments (DeMonte, 2013; Johnson et al., 2013). The study from Thamprateep (2016) found that in developing science teachers, they must be able to apply technological knowledge and pedagogy into teaching to develop students to meet the goal of curriculum. The knowledge framework proposed by Koehler and Mishra offers an insight for teacher development, specially for out-of-field teachers where they the integration of knowledge comes into play. The study by Vale (2010) proved that pedagogical content knowledge developed in out-of-field mathematic teachers yields a success for professional development.

Productive pedagogies show a framework for professional development in terms of classroom pedagogy - the framework found from a longitudinal study by education Queensland in 2010. The framework serves as a guide for classroom reflection manual; it could be used in the design of professional development and helps make decision about teacher's practice (Education Queensland, 2010b). In this case, we focus on intellectual quality aspect and supportive classroom environment

aspect. Intellectual quality in the model we are looking at includes metalanguage, deep knowledge, and knowledge problematic; these items are the areas of need for developing out-of-field teachers. These items reflect an understanding of knowledge as being socially constructed, establishing relatively complex connections to the central learning concepts, demonstrating a deep understanding of those concepts, promoting high levels of talk, and writing within classroom practices (Education Queensland, 2010a, pp. 3-9). While supportive classroom environment items used in this model are self-regulation, engagement, and student control, these items reflect the environment of the classroom in terms of how the students regulate themselves in their study, how much control they have in their learning, and how much they participate in class. These items are indicators that help teachers to attain better academic result for students. The supportive classroom environment emphasises the importance of supporting students by conveying high expectations to them, applying student-centred learning activities, demonstrating self-regulation and academic engagement and providing students with frequent and detailed statements about their performance (Education Queensland, 2010a, pp. 15-19).

Student's Academic Achievement (Outcome) is the ultimate outcome that we hope the out-of-filed teachers can improve on the students. The shortage on qualified teachers is a problem in Thailand and teacher shortage hinders student academic achievement (World Bank, 2012). This is why we pay attention to the special characteristics of out-of-field teachers in Thailand and hope to develop them through professional development. The OECD (2005) report entitled "Teachers Matter" comes to the conclusion that teachers' quality is the most important factor in an education system, and is the second most important factor only after family background. As an educator and school administrator, we are able to control certain factors that affect student's academic achievement, one is teachers, therefore it is necessary that we develop out-of-field teachers, who play a vital part in affecting student's academic achievement.

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Chulalongkorn University

5.3 Recommendations

5.3.1 Recommendations for the Utilisation of the Research Results

1) Government level

The government sector, for instance, the teachers' council of Thailand could consider the TPACK and Productive Pedagogies Transformative Model as a guideline to develop out-of-field teachers who are applying for the temporary teaching permit.

The government could issue a policy on all out-of-field teachers to join a professional development programme for 1 term after obtaining a temporary teaching permit.

The government could seek educational service area office for collaboration to train and supply the trained out-of-field teachers to the needed schools.

The government could seek medium-sized and large schools that offer primary 1-6 to pilot a professional development programme for out-of-field teachers and expand the programme once it becomes a success.

The government can further the study on the current and desirable states, priority needs, strengths and weaknesses of out-of-field teachers and the characteristics of out-of-field teachers in Thailand in a wider area.

The government can use the research results as information in policy making regarding out-of-field teaching in Thailand.

2) School Level

Private schools in Thailand can use TPACK and Productive Pedagogies Transformative Model to develop their out-of-field teachers, especially in the fields of Mathematics, Thai, Social Studies, and English.

The school can use TPACK and Productive Pedagogies Transformative Model as a guideline to develop their own programme to help support out-of-field teachers.

The school can analyse the information from the current and desirable states, priority needs, strengths and weaknesses of out-of-field teacher development and use it as a tool in their own professional development.

The conceptual framework can be a guideline and insights to develop both in-field and out-of-field teachers in school.

3) Individual Level

School administrators and heads can use the conceptual framework as a guideline to develop out-of-field teachers and in-field teachers at their school.

School administrators, heads, and staff can use the information such as the comparison of out-of-field teaching subjects and school sizes, or current and desirable states to better understand the needs of out-of-field teachers and develop a system that can support them as a whole.

School administrators, heads, teachers, and staff can use the research results to develop professional development programme based on TPACK and Productive Pedagogies Transformative Model, which can continuously be operated for all the new out-of-field teachers.

5.3.2 Recommendations for Further Research

1) The research should study a wider context and gather more samples in order to get deeper insights on the characteristics of out-of-field teachers in Thailand.

2) The TPACK and Productive Pedagogies Transformative Model should be implemented in schools with out-of-field teachers to see if the model can help to improve student's academic achievement.

3) The TPACK and Productive Pedagogies Transformative Model should be implemented in schools with both in-field and out-of-field teachers to see if the model can develop both types of teachers to improve student's academic achievement.

4) The implementation of TPACK and Productive Pedagogies Transformative Model should be studied along the implementation to unfold the best practice, success factors and other variables that bring a success to out-of-field teacher development.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

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จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

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APPENDIX

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APPENDIX A

RESEACH INSTRUMENTS

1) Conceptual Framework Expert's Validation Form
2) Expert's Validation for Research Instrument
3) The Evaluation of the Conceptual Framework Expert's Validation Form
4) The Evaluation of the Research Questionnaire

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Conceptual Framework Expert's Validation Form

เรื่อง: รูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ

Title: Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies.

Indication: 1) The conceptual framework evaluation form will apply the IOC (Item-objective congruency index) evaluation method on the doctoral dissertation title "Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies" in order to gain useful feedback from the experts toward the conceptual framework of this research as well as the appropriateness in the application of the conceptual framework in order to construct the research instrument to collect datas. IOC will be used to validate the appropriateness of the statement in each item.

The IOC form will be used to measure the content validity based on the following criteria (Rovinelli, Richard J.; Hambleton, Ronald K., 1976):

+1 means the components of the conceptual framework is appropriate

0 means the components of the conceptual framework is unclear

-1 means the components of the conceptual framework is not appropriate

2) Related documents for consideration

2.1) Attachment 1 the experts' validation of the conceptual framework.

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2.2) Attachment 2 shows the details of the sources of the conceptual framework and the synthesis of the conceptual framework of the study.

2.3) Attachment 3 shows Significance to educational administration, research questions, objectives of the study, and significance of the study.

2.4) Attachment 4 shows definition of terms of the conceptual framework of the study.

For any inquiries, please contact Natthawut Katechaiyo, Tel:0870717105, Email nutchaiyo01@gmail.com

Attachment 1

Part 1: General information of the expert

Please fill in all the requirement fields in English

Academic Title.....

First Name.....Middle Name.....Last Name.....

Highest degree.....Name of institution.....

Contact details Email:.....Tel.....

Part 2: The index of item-objective congruence (IOC) evaluation of the conceptual framework. Please evaluate content validity of each component of the conceptual framework by giving the components a rating as follows.

+1 means the components of the conceptual framework is appropriate

0 means the components of the conceptual framework is unclear

-1 means the components of the conceptual framework is not appropriate

Table 1: Teachers Development Models Based on the Concept of Kennedy (2005) / รูปแบบการพัฒนาครูตามแนวคิดของแคนนีดี้ (2005)

Please rate these following items according to your opinions.

Congruent = 1 Questionable = 0 Incongruent = -1

Teacher Development Models รูปแบบการพัฒนาครู	Congruent (1)	Questionable (0)	Incongruent (-1)	**Comments**
1) Transmission Model (รูปแบบการถ่ายทอด)				
1.1) The Training model (รูปแบบการฝึกอบรม)				
1.2) The award-bearing model (รูปแบบการเรียนเพิ่มวุฒิ)				
1.3) The deficit model (รูปแบบการเติมเต็มสิ่งที่ขาด)				
1.4) The cascade model (รูปแบบการขยายผล)				

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Teacher Development Models **รูปแบบการพัฒนาครู**	Congruent (1)	Questionable (0)	Incongruent (-1)	**Comments**
2) Transitional (รูปแบบการส่งผ่าน)				
2.1) The standard-based model (รูปแบบการการพัฒนามาตราฐานวิชาชีพ)				
2.2) The coaching/mentoring model (รูปแบบการโค้ชและพี่เลี้ยง)				
2.3) The community of practice model (รูปแบบชุมชนนักปฏิบัติ)				
3) Transformative (การเปลี่ยนแปรง)				
3.1) The action research model (รูปแบบการวิจัยเชิงปฏิบัติการ)				
3.2) The transformative model (รูปแบบการเปลี่ยนแปลง)				
4. Others (Please specify) อื่นๆ				

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Table 2: Productive Pedagogies Based on the Concept of the State of Queensland, Department of Education (2002) /ศาสตร์การสอนที่มีผลิตภาพตามแนวคิดของกรมศึกษาธิการรัฐควีนแลนด์ (2002)

Please rate these following items according to your opinions.

Congruent = 1 Questionable = 0 Incongruent = -1

Productive Pedagogies and sub components องค์ประกอบศาสตร์การสอนที่มีผลิตภาพ	Congruent (1)	Questionable (0)	Incongruent (-1)	Comments
1) Intellectual quality (คุณภาพทางปัญญา)				
1.1) Higher order thinking (ทักษะการคิดขั้นสูง)				
1.2) Deep knowledge (ความรู้เชิงลึก)				
1.3) Deep understanding(ความเข้าใจเชิงลึก)				
1.4) Substantive conversation (การสนทนาอย่างมีสาระสำคัญ)				
1.5) Knowledge problematic (ความรู้ที่เป็นปัญหา)				
1.6) Metalanguage (อภิภาษา)				
2) Connectedness (ความเชื่อมโยง)				
2.1) Knowledge integration (การบูรณาการความรู้)				
2.2) Background knowledge (ความรู้พื้นฐาน)				
2.3) Connectedness to the world (ความเชื่อมโยงกับภายนอก)				
2.4) Problem based				

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Productive Pedagogies and sub components องค์ประกอบศาสตร์การสอนที่มีผลิตภาพ	Congruent (1)	Questionable (0)	Incongruent (-1)	Comments
curriculum (หลักสูตรโดยใช้ปัญหาเป็นฐาน)				
3) Supportive classroom environment (สภาพแวดล้อมห้องเรียนที่สนับสนุน)				
3.1) Student control/direction (การสอนถูกควบคุมหรือกำหนดโดยนักเรียน)				
3.2) Social support (การสนับสนุนทางสภาพแวดล้อมและสังคม)				
3.3) Engagement (การมีส่วนร่วม)				
3.4) Explicit criteria (เกณฑ์การประเมินผลที่ชัดเจน)				
3.5) Self-regulation (การกำกับตนเอง)				
4) Recognition of difference (การยอมรับความแตกต่าง)				
4.1) Cultural knowledge (ความรู้เกี่ยวกับวัฒนธรรม)				
4.2) Inclusivity (การเข้าถึงนักเรียนอย่างทั่วถึง)				
4.3) Narrative (การบรรยายตามลำดับเหตุการณ์)				
4.4) Group identity (เอกลักษณ์กลุ่ม)				
4.5) Citizenship (ความเป็นพลเมือง)				

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Table 3: Technological Pedagogical Content Knowledge Based on the Concept of Koehler & Mishra (2009)

แนวคิดความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหาตามแนวคิดของโคเรอและมิชรา (2009)

Please rate these following items according to your opinions.

Congruent = 1 Questionable = 0 Incongruent = -1

Contents areas of Technological Pedagogical Content Knowledge เนื้อหาความรู้บูรณาการทางในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	Congruent (1)	Questionable (0)	Incongruent (-1)	Comments
1. Content knowledge (CK) (ความรู้ในเนื้อหา)				
2. Pedagogical knowledge (PK) (ความรู้ในด้านศาสตร์การสอน)				
3. Technological knowledge (TK) (ความรู้ในด้านเทคโนโลยี)				
4. Pedagogical content knowledge (PCK) (ความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา)				
5. Technological content knowledge (TCK) (ความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา)				
6. Technological pedagogical knowledge (TPK) (ความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน)				
7. Technological pedagogical content knowledge (TPACK) (ความรู้บูรณาการในด้านเทคโนโลยีศาสตร์การสอนและเนื้อหา)				
8. Others (please specify)				

Comments.....

.....

Expert's Signature.....

( )

Date.....

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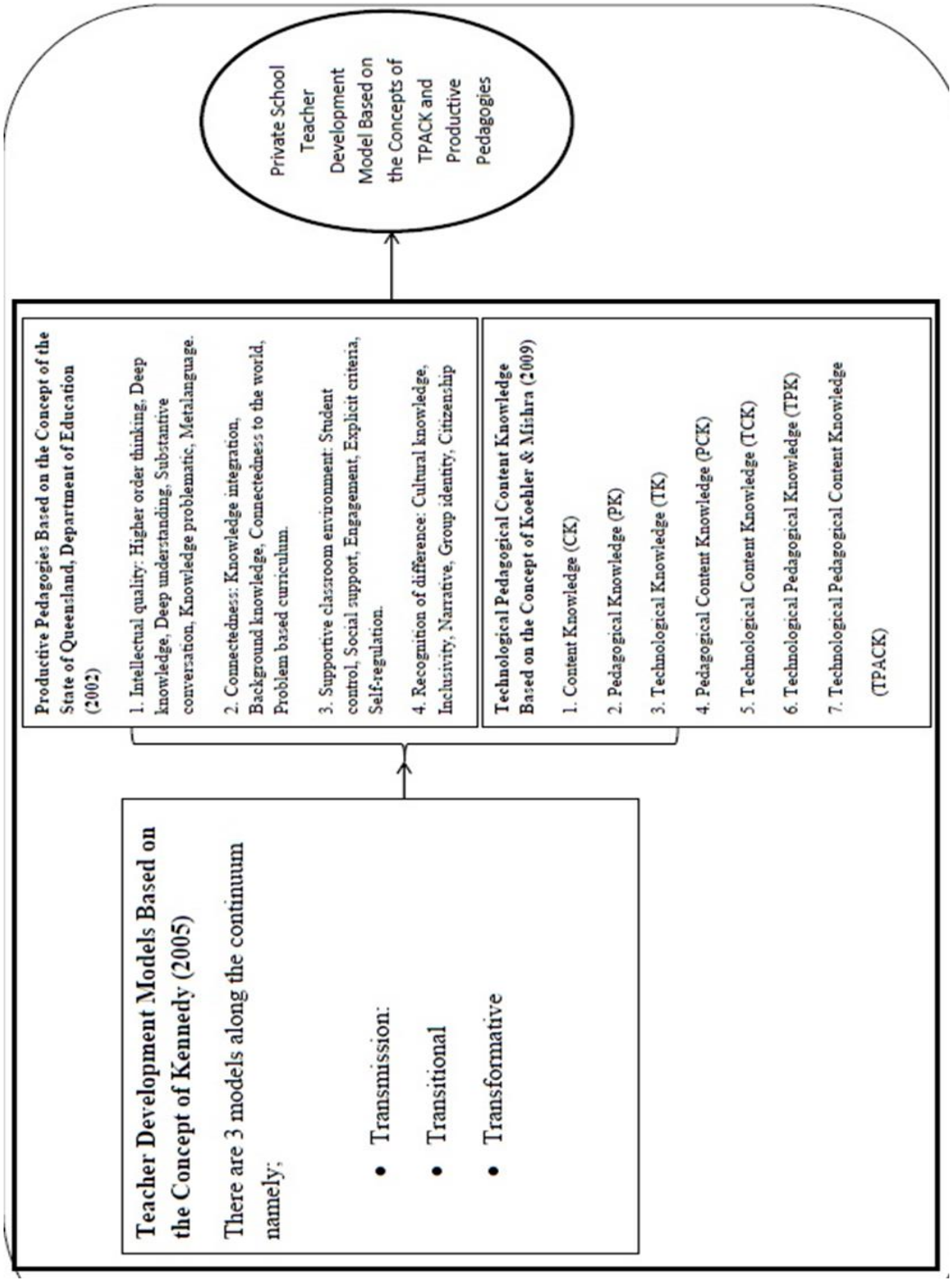
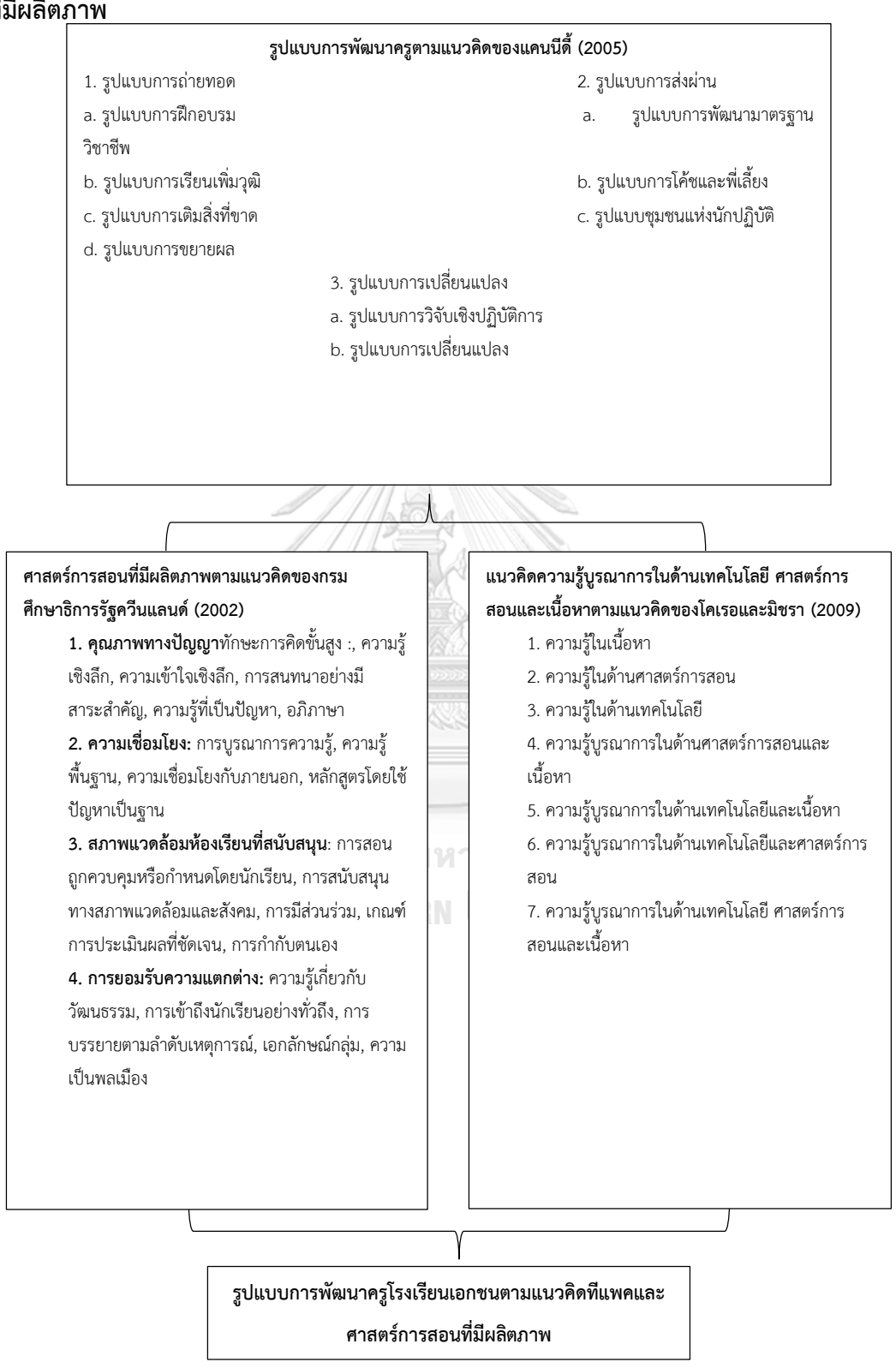
Attachment 2

Conceptual Framework: Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogie



กรอบแนวคิดรูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ



Conceptual Framework

1. Teacher Development Models Based on the Concept of Kennedy (2005)

If the purpose of professional learning is attitudinal development—that is, changes in intellectual and motivational aspects as well as functional development (Evans, 2002) then we must consider how this might be facilitated. Kennedy's (2005) analytical framework suggests that professional learning opportunities can be located along a continuum where the underpinning purposes of particular models of CPD can be categorised as **transmissive', transitional' or transformative'**. Models of CPD where the purpose is deemed to be transmissive rely on teacher development through externally delivered, expert tuition (Sprinthall et al., 1996), focusing on technical aspects of the job rather than issues relating to values, beliefs and attitudes. This type of CPD does not support professional autonomy; rather, it supports replication and, arguably, compliance. Within the transitional models, CPD has the capacity to support either a transmissive agenda or a transformative agenda, depending on its form and philosophy. Models that fit under this category include coaching/mentoring and communities of practice. At the other end of the spectrum, transformative professional learning suggests strong links between theory and practice (Sprinthall et al., 1996), internalisation of concepts, reflection, construction of new knowledge and its application in different situations, and an awareness of the professional and political context. Transformative models of CPD have the capacity to support considerable professional autonomy at both individual and profession-wide levels.

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Table 4: Characteristics of Teacher Development Models Based on the concept of Kennedy (2005)

Characteristics	**Type of models base on Kennedy (2005)**		
	Transmission	**Transitional**	**Transformation**
Mode of deliver	Expert	Expert/community	Expert/community/interest
Participant role/leadership	Passive	Active	Passive/active
Context/job-embedded	Decontextualise	Context specific	Contextually void (Depend on change)
Mode of support	Central control	Central control/ share control	Share control
View of teacher development	Standard-based view	Standard-based view	No standard
Encourage collaboration	None	Personal/Group	Personal/Group
Reflective dialogue	None	Personal/share/ongoing	Personal/share/ongoing
Capacity for autonomy	No autonomy	Interchangeably	High autonomy
Teaching context	Direct teaching	Learning in School	Learning in school / Out of school
Domain of influence	-	Personal/social/occupational	Personal/Social/Occupational
Sphere of action	Formal/Planned	Formal/Planned, Informal/Incidental	Formal/Planned, Informal/Incidental

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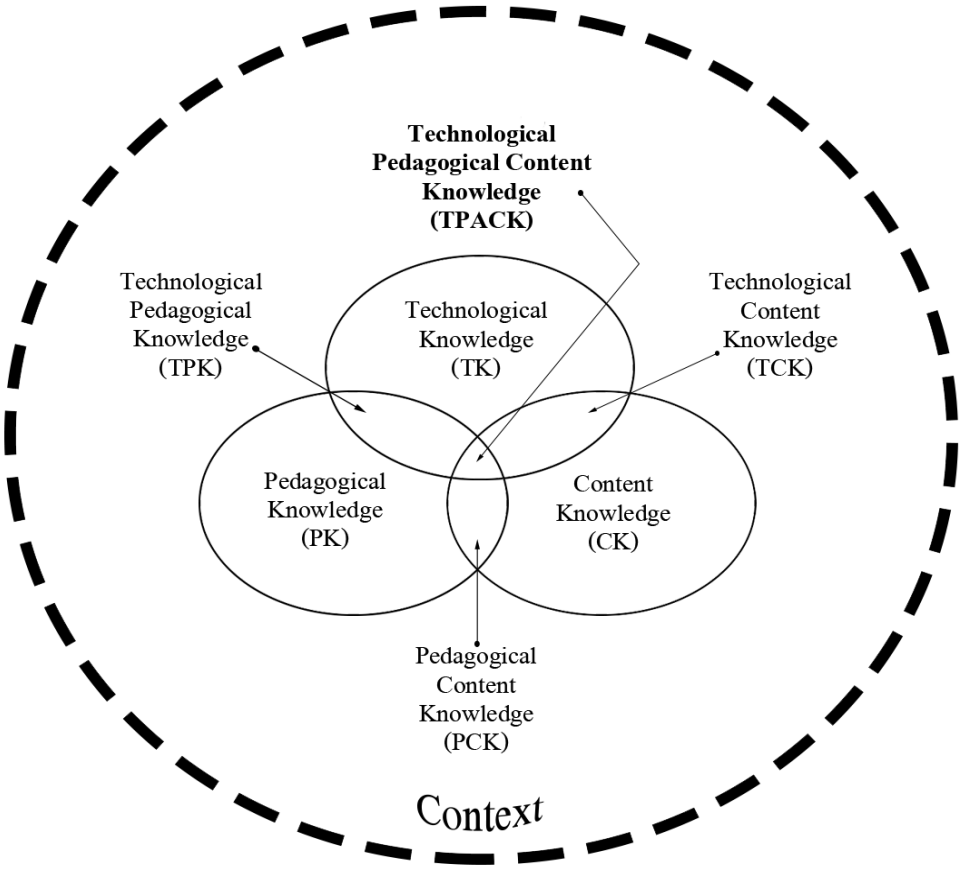
2. Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge

The TPACK framework considers three distinct and interrelated areas of teaching, as represented by figure 1. The notion of TPACK is quickly becoming ubiquitous within the educational technology community, becoming popular among researchers and practitioners alike, as it attempts to describe the complex-relationship between and among the domains of



content, pedagogy, and technology-related knowledge (**Koehler & Mishra (2009)**.

Figure1 The Seven Components of TPACK. (Image from http://tpack.org)

At the heart of the TPACK framework, is the complex interplay of three primary forms of knowledge: Content (CK), Pedagogy (PK), and Technology (TK). The TPACK approach goes beyond seeing these three knowledge bases in isolation. The TPACK framework goes further by emphasizing the kinds of knowledge that lie at the intersections between three primary forms: Pedagogical Content Knowledge (PCK), Technological Content

Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK).

Effective technology integration for pedagogy around specific subject matter requires developing sensitivity to the dynamic, transactional relationship between these components of knowledge situated in unique contexts. Individual teachers, grade-level, school-specific factors, demographics, culture, and other factors ensure that every situation is unique, and no single combination of content, technology, and pedagogy will apply for every teacher, every course, or every view of teaching.

Components of TPACK Framework for Professional Development

1) Content Knowledge (CK) – "Teachers' knowledge about the subject matter to be learned or taught. The content to be covered in middle school science or history is different from the content to be covered in an undergraduate course on art appreciation or a graduate seminar on astrophysics... As Shulman (1986) noted, this knowledge would include knowledge of concepts, theories, ideas, organizational frameworks, knowledge of evidence and proof, as well as established practices and approaches toward developing such knowledge" (Koehler & Mishra, 2009).

2) Pedagogical Knowledge (PK) – "Teachers' deep knowledge about the processes and practices or methods of teaching and learning. They encompass, among other things, overall educational purposes, values, and aims. This generic form of knowledge applies to understanding how students learn, general classroom management skills, lesson planning, and student assessment." (Koehler & Mishra, 2009).

3) Technology Knowledge (TK) – Knowledge about certain ways of thinking about, and working with technology, tools and resources. and working with technology can apply to all technology tools and resources. This includes understanding information technology broadly enough to apply it productively at work and in everyday life, being able to recognize when information technology can assist or impede the achievement of a goal, and being able continually adapt to changes in information technology (Koehler & Mishra, 2009).

4) Pedagogical Content Knowledge (PCK) – "Consistent with and similar to Shulman's idea of knowledge of pedagogy that is applicable to the teaching of specific content. Central to Shulman's conceptualization of PCK is the notion of the transformation of the subject matter for teaching. Specifically, according to Shulman (1986), this transformation occurs as the teacher interprets the subject matter, finds multiple ways to represent it, and adapts and tailors the instructional materials to alternative conceptions and students' prior knowledge. PCK covers the core business of teaching, learning, curriculum, assessment and reporting, such as the conditions that promote learning and the links among curriculum, assessment, and pedagogy" (Koehler & Mishra, 2009).

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5) Technological Content Knowledge (TCK) – "An understanding of the manner in which technology and content influence and constrain one another. Teachers need to master more than the subject matter they teach; they must also have a deep understanding of the manner in which the subject matter (or the kinds of representations that can be constructed) can be changed by the application of particular technologies. Teachers need to understand which specific technologies are best suited for addressing subject-matter learning in their domains and how the content dictates or perhaps even changes the technology—or vice versa" (Koehler & Mishra, 2009).

6) Technological Pedagogical Knowledge (TPK) – "An understanding of how teaching and learning can change when particular technologies are used in particular ways. This includes knowing the pedagogical affordances and constraints of a range of technological tools as they relate to disciplinarily and developmentally appropriate pedagogical designs and strategies" (Koehler & Mishra, 2009).

7) Technological Pedagogical Content Knowledge (TPACK) – "Underlying truly meaningful and deeply skilled teaching with technology, TPACK is different from knowledge of all three concepts individually. Instead, TPACK is the basis of effective teaching with technology, requiring an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones" (Koehler & Mishra, 2009).

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3. Productive Pedagogies Based on the Concept of the State of Queensland, Department of Education (2002)

The twenty Productive Pedagogies under the four dimensions are constructed in the Productive Pedagogies Classroom Reflection Manual, as a guide from Queensland Education, to provide an index of quality teaching and students' learning and to be used to help teachers to reflect on their classroom practices and generating professional development dialogue. It could also be used to assist designing curriculum and learning experiences and help making intelligent decisions about individual students' needs (Education Queensland, 2010b).

Table 5: Productive pedagogy dimensions summarize table, items and key questions addressed (The State of Queensland, Department of Education, 2002).

Intellectual quality	
Higher order thinking	Are students using higher-order thinking operations within a critical framework?
Deep knowledge	Does the lesson cover operational fields in any depth, detail or level of specificity?
Substantive conversation	Does classroom talk lead to sustained conversational dialogue between students, and between teacher and students, to create or negotiate understanding of subject matter?
Knowledge problematic	Are students critically examining texts, ideas and knowledge?
Metalanguage	Are aspects of language, grammar and technical vocabulary being given prominence?
Connectedness	
Knowledge integration	Does the lesson integrate a range of subject areas?
Background knowledge	Are links with students' background knowledge made explicit?
Connectedness to the world	Is the lesson, activity or task connected to competencies or concerns beyond the classroom?
Problem based curriculum	Is there a focus on identifying and solving intellectual and/or real-world problems?
Supportive classroom environment	
Student direction	Do students determine specific activities or outcomes of the lesson?
Social support	Is the classroom characterized by an atmosphere of mutual respect and support between teacher and students, and among students?
Academic engagement	Are students engaged and on-task during the lesson?
Explicit quality performance criteria	Are the criteria for judging the range of student performance made explicit?
Self-regulation	Is the direction of student behavior implicit and self-regulatory?

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Recognition of difference Cultural knowledge Inclusivity Narrative Group identity Active citizenship	 Are non-dominant cultures valued? Are deliberate attempts made to ensure that students from diverse backgrounds are actively engaged in learning? Is the style of teaching principally narrative or is it expository? Does the teaching build a sense of community and identity? Are attempts made to encourage active citizenship within the classroom?

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Attachment 3

Significance to the Study of Educational Administration

The effectiveness of administrators is a key to drive organizations or schools. Superintendents, principals, and others with authority in school systems are instrumental in providing the vision, time, and resources to support continual professional learning, a positive school climate, and success for all students. Administrators are in charge and responsible for planning resources such as man, money, materials and methods to bring out an effective organization or school. One of the important resources in all organizations is man or employees; in school context, it is teachers. School administrators have to support and enhance teachers' knowledge, capability, skills etc. so they can bring success for all students.

In this case we will focus on an area of out-of-field teacher development. According to Hobbs (2012), school administrators need to consider the school context, school support and development plans, and teachers' prior knowledge and relating knowledge to out-of-field teachers in developing a professional development program for out-of-field teachers. She further explains that there is still a lack of understanding of the significance of out-of-field teaching experiences and it is an international concern to perceive that it is acceptable to put out-of-field teachers to positions out of their field. From the statements, we can see that there are special characteristics of out-of-field teachers and it is the reason why we need to pay attention to this.

Specifically in Thailand where we have many "out-of-field" teachers, we need to make sure that they feel confident in teaching and support them on their teaching practice. According to Prahakul and Traiwichikhun (2016), it is found that 59.4 % of Thai teachers who are working under the Office of Primary Education Service Areas have been assigned to teach out-of-field and there is a significant impact on student's academic achievement comparing to in-field teachers. While a lack of qualify teachers causes the school to put teacher out-of-field, private schools in Thailand can hire a person who does not have a degree in education to teach in schools through a temporary teaching license (Kurusapha, 2014). This means all private schools in Thailand can hire a person who does not have educational degrees. As mentioned earlier, there is a significant difference between in-field and out-of-field teacher quality; it is urging us to look into ways to develop teachers who are out-of-field, especially those who are working in private schools. Some out-of-field teachers are assigned to positions for which they are not suitably qualified. One way to support them is through professional development. Teachers who go through a professional development program will be equipped with capability to teach and ways to raise students' achievement.

However, there are many factors that contribute to a student's achievement, including individual characteristics, family, and community, for example. But research suggests that, among school-related factors, teachers matter most. When it comes to student performance, teachers estimated to have two to three times in comparison with the impact of any other school factors, including services, facilities, and even leadership. (McCaffrey, Lockwood, Koretz, & Hamilton, 2003; Rowan, Correnti & Miller, 2002; Rivkin, Hanushek, & Kain, 2000) As we can see, school administrators are key people to drive schools and are those who bring success for all stakeholders including teachers, students, parents, and ultimately society.

Research Questions

1) What are the conceptual frameworks for private school teacher development model based on the concepts of TPACK and productive pedagogies?

กรอบแนวคิดสำหรับพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพคืออะไร

2) What are the current and desirable states related to the development model of private school teachers?

สภาพปัจจุบันและสภาพพึงประสงค์ของรูปแบบการพัฒนาครูดรงเรียนเอกชนคืออะไร

3) What is the appropriate model for private school teacher based on the concepts of TPACK and productive pedagogies?

รูปแบบการพัฒนาครูโรงเรียนเอกชนที่เหมาะสมตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพคืออะไร

จุฬาลงกรณ์มหาวิทยาลัย
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Research Objectives

1) To study conceptual frameworks for private school teacher development based on the concepts of TPACK and productive pedagogies.

เพื่อศึกษากรอบแนวคิดการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ

2) To study the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies.

เพื่อศึกษาสภาพปัจจุบันและสภาพที่พึงประสงค์ของรูปแบบการพัฒนาครูเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ

3) To develop a private school teacher development model based on the concepts of TPACK and productive pedagogies.

เพื่อพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ

Scope of the Population and Research

This research applies a sequential exploratory mixed-methods approach (Creswell & Plano Clark, 2007: 85), exploring qualitative data first and then quantitative data to develop a private school teacher development model.

Population: The population in this research is 3,776 schools under Office of Private Educational Commission (Ministry of Information and Communication Technology, 2013)

Informants: The informants in this research are 351 administrators and 351 out-of-field teachers at the Office of Private Education Commission. The sample numbers were calculated using Krejcie and Morgan equation (Krejcie & Morgan, 1970).

Research instruments: questionnaires on the present and desirable state of out-of-field teacher development, model evaluation form, and related documents concerning out-of-field teacher development model.

Data analysis: descriptive statistics and PNI modified (mean and standard deviation for each item), and content analysis is used to analyze the interview data.

Significance of the Study

This research investigates the aspects concerning the shortage of teachers and ministry of education policy that gear towards solving this problem. It also aims to find the ineffectiveness of the teaching permit without license system and to overcome its ineffectiveness through the implementation of a training course. This will give insight in the process of teacher recruitment and licensing of the ministry of education. The priority-needs assessment analysis will give insight on the aspects of out-of-field teachers' needs towards effective instruction, while the training aims to benefit the performance of trained teachers and student academic achievement. As a result, the researcher expects that out-of-field teachers can also effectively teach upon the completion of the training course.

Expected Outcome/ Benefits of the Study

1) The result of the research will reveal information regarding out-of-field teaching and challenges that out-of-field teachers face and model that helps to support and better improve the quality of out-of-field teachers.

2) Private schools and Public schools would have a model that help to improve the instructional quality of out-of-field teachers in schools and better educate the students in order to achieve desirable outcomes.

3) Teachers and administrators may use the model as a guideline in their classroom practice to improve their quality of instruction and quality of learning.

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Chulalongkorn University

Attachment 4

Definitions of Terms

1) Teachers refers to private school out-of-field teachers teaching in primary and secondary schools who haven't received their bachelor degree in education and teachers who have a bachelor's degree in education but have been or currently been assigned to teach out of their own field.

ครูหมายถึง ครูโรงเรียนเอกชนที่สอนไม่ตรงเอกในระดับประถมศึกษาและมัธยมศึกษา ซึ่งไม่ได้สำเร็จการศึกษาในสาขาวิชาครุศาสตร์หรือศึกษาศาสตร์และครูที่จบในสาขาวิชาครุศาสตร์หรือศึกษาศาสตร์แต่ทำการสอนในวิชาที่ตนไม่ได้เรียนมา

2) Factors influencing out-of-field teacher development refers to factors that affect out-of-field teacher quality of instruction and if overcome it will help to raise students' achievement. The concept of the factors influencing out-of-field teachers (Hobbs, 2012) will be discussed and mentioned in this research. The factors influencing out-of-field teachers are:

2.1) Context: Geographical region, school size and design, school and state governance structures, practice and policy.

2.2) Support Mechanisms: Provision; support materials, processes and people. Self-sought; professional development, collegial sharing and discourse, external support. Self-constructed; personal experiences and personal research.

2.3) Personal Resources: Adaptive expertise; balancing innovation and efficiency. Teacher knowledge; Disciplinary background, what and how to teach learners, Curriculum documents. Dispositions; confidence with disciplinary ideas and modes of inquiry, commitment to the subject and students.

3) Professional Development Models refer to a model based on Kennedy's (2005) analytical framework, which suggests that professional learning opportunities can be located along a continuum where the underpinning purposes of particular models of CPD can be categorised as 'transmissive', 'transitional' or 'transformative'. There are 3 models and sub models along the continuum namely;

3.1) Transmission Model refers to a teacher development model that naturally function through externally delivered, 'expert' tuition focusing on technical aspects of the job rather than issues relating to values, beliefs and attitudes. This type of CPD does not support professional autonomy; rather, it supports replication and, arguably, compliance.

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

3. 2) Transitional Models relies on both experts and community as a knowledge platform and community of practice. It reflects the reflective dialogue where constant feedback is an ongoing process. While certain level of autonomy depends on the role of the participants.

3.3) Transformative Model refers to a model that suggests strong links between theory and practice (Sprinthall et al., 1996), internalisation of concepts, reflection, construction of new knowledge and its application in different situations, and an awareness of the professional and political context. Transformative models of CPD have the capacity to support considerable professional autonomy at both individual and profession-wide levels.

รูปแบบการพัฒนาครู หมายถึง รูปแบบการพัฒนาครูของแคนนีดี้ (2005) ได้กล่าวไว้ว่าการพัฒนาวิชาชีพสามารถระบุจำแนกออกมาได้ รูปแบบ 3หลักและรูปแบบย่อยดังนี้

รูปแบบการถ่ายทอด หมายถึง รูปแบบการพัฒนาครูโดยมีผู้เชี่ยวชาญเป็นคนถ่ายทอดเนื้อหาความรู้เกี่ยวกับเนื้องานโดยปราศจากประเด็นที่เกี่ยวกับค่านิยม ความเชื่อและทัศนคติ การพัฒนาในรูปแบบนี้จะไม่ส่งเสริมให้มีอิสระทางวิชาชีพแต่จะส่งเสริมให้มีปฏิบัติตามแบบแผนเดิมที่มีอยู่แล้ว

รูปแบบการส่งผ่าน หมายถึง รูปแบบการพัฒนาครูโดยมีผู้เชี่ยวชาญและชุมชนเป็นฐานความรู้และชุมชนแห่งการเรียนรู้ ในรูปแบบนี้จะมีทำให้เกิดการสะท้อนความคิดที่มีการเสนอแนะความคิดเห็นต่างๆตลอดเวลาแต่ในขณะเดียวกันอิสระภาพในการเรียนรู้ขึ้นอยู่กับบทบาทของผู้เร่วมด้วยเหมือนกัน

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

รูปแบบการเปลี่ยนแปลง หมายถึง รูปแบบการพัฒนาครูโดยมีการเชื่อมโยงระหว่างการปฏิบัติและทฤษฎี ทำให้เกิดการผนึกแนวคิด ทำให้มีการสะท้อนความคิดและสร้างความรู้ใหม่ที่สามารถนำไปใช้ในสถานการณ์ต่างๆและเกิดความตระหนักในบริบททางวิชาชีการเมือง รูปแบบการเปลี่ยนแปลงนี้สนับสนุนส่งเสริมให้เกิดความความเป็นอิสระในทางวิชาชีพทั้งในระดับบุคคลและในระดับที่กว้างขึ้น

4) Technological Pedagogical Content Knowledge refers to the complex interplay of three primary forms of knowledge which serves as a guideline for the domain of knowledge in this research. The primary knowledge domain consists of:

4.1) Content Knowledge (CK) refers to teachers' knowledge about the subject matter to be learned or taught.

4.2) Pedagogy Knowledge (PK) refers to teachers' deep knowledge about the processes and practices or methods of teaching and learning.

4.3) Technology (TK) refers to knowledge about certain ways of thinking about, working with technology, tools, and resources.

The knowledge that lie at the intersections between three primary forms:

4.4) Pedagogical Content Knowledge (PCK) refers to knowledge of pedagogy that is applicable to the teaching of specific content. It is the notion of the transformation of the subject matter for teaching.

4.5) Technological Content Knowledge (TCK) refers to an understanding of the manner in which technology and content influence and constrains one another.

4.6) Technological Pedagogical Knowledge (TPK) refers to an understanding of how teaching and learning can change when particular technologies are used in particular ways.

4.7) Technological Pedagogical Content Knowledge (TPACK) refers to a deeply skilled teaching with technology, it is the basis of effective teaching with technology, requiring an understanding of the presentation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help address some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones.

ทีแพค หมายถึง องค์ความรู้ที่ครูควรมีองค์ความรู้หลักทั้งสามคือ ความรู้ในด้านเนื้อหา ความรู้ในด้านศาสตร์การสอน ความรู้ในด้านเทคโนโลยี

ความรู้ในด้านเนื้อหา หมายถึง ความรู้ของครูที่เกี่ยวกับเนื้อหาวิชาที่จะสอน

ความรู้ในด้านศาสตร์การสอน หมายถึง ความรู้ความเข้าใจอย่างลึกซึ้งของครูเกี่ยวกับกระบวนการและแนวปฏิบัติหรือวิธีการสอนและการเรียนรู้

ความรู้ในด้านเทคโนโลยี หมายถึง ความรู้เกี่ยวกับวิธีคิดประยุกต์ที่จะทำงานร่วมกับเทคโนโลยี อุปกรณ์ในการสอนและทรัพยากรต่างๆ

ความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา หมายถึง ความรู้ด้านศาสตร์การสอนที่สามารถปรับไปใช้กับการสอนเนื้อหาวิชา มันคือความเข้าใจเกี่ยวกับการเปลี่ยนเนื้อหาวิชาสำหรับสอน

ความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา หมายถึง ความใจเกี่ยวกับวิธีการที่เทคโนโลยีและเนื้อหามีอิทธิพลต่อกันและกัน

ความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน หมายถึง ความเข้าใจว่าการสอนและการเรียนรู้สามารถเปลี่ยนแปลงได้เพื่อใช้เทคโนโลยีในการสอน

ความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา หมายถึง การสอนทักษะเชิงลึกด้วยเทคโนโลยี สิ่งนี้เป็นพื้นฐานของการสอนที่มีประสิทธิภาพด้วยเทคโนโลยีซึ่งจำเป็นต้องมีความเข้าใจในการใช้เทคโนโลยีในการนำเสนอเนื้อหาหรือแนวคิด รวมทั้งใช้เทคนิคการสอนกับเทคโนโลยีเพื่อสร้างเนื้อหาการสอนอย่างสร้างสรรค์เช่น ทำให้องค์ความรู้ที่เข้าใจยากง่ายต่อการเรียน ใช้เทคโนโลยีเพื่อช่วยเหลือในการแก้ปัญหาที่นักเรียนพบเจอในการเรียนหรือใช้ในการวัดความรู้เดิมขอนักเรียนและทฤษฎีความรู้ต่างๆ และความรู้เกี่ยวกับเทคโนโลยีสามารถนำไปใช้เพื่อพัฒนาองค์ความรู้ที่มีอยู่ของนักเรียนเพื่อสร้างองค์ความรู้ใหม่หรือเสริมสร้างองค์ความรู้เดิม

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

5) Productive Pedagogies refers to the twenty Productive Pedagogies under the four dimensions that are constructed in the Productive Pedagogies Classroom Reflection Manual, as a guide from Queensland Education, to provide an index of quality teaching and students' learning and to be used to help teachers to reflect on their classroom practices and generating professional development dialogue. Productive pedagogies dimensions, items and key questions addressed (The State of Queensland, Department of Education, 2002):

Intellectual quality: Higher order thinking, Deep knowledge, Deep understanding, Substantive conversation, Knowledge problematic, Metalanguage.

Relevance: Knowledge integration, Background knowledge, Connectedness to the world, Problem based curriculum.

Supportive classroom environment: Student control, Social support, Engagement, Explicit criteria, Self-regulation.

Recognition of difference: Cultural knowledge, Inclusivity, Narrative, Group identity, Citizenship

ศาสตร์การสอนที่มีผลิตภาพ หมายถึงศาสตร์การสอนที่ผลิตภาพทั้ง 20 ด้านภายใต้ 4 มิติใหญ่ที่ถูกสร้างขึ้นในคู่มือการสะท้อนห้องเรียนของศาสตร์การสอนที่มีผลิตภาพเพื่อเป็นแนวทางในการสอนโดยกรมศึกษาธิการรัฐควีนแลนด์ กรจัดทำคู่มือนี้เพื่อเป็นดัชนีวัดคุณภาพของการสอนและการเรียนรู้ของนักเรียนและเพื่อให้ครูสะท้อนการสอนของตัวเองและสร้างดารขับเคลื่อนการพัฒนาวิชาชีพครู องค์ประกอบของศาสตร์การสอนที่มีผลิตภาพตามแนวคิดของกรมศึกษาธิการรัฐควีนแลนด์ (2002):

คุณภาพทางปัญญา: ทักษะการคิดขั้นสูง, ความรู้เชิงลึก, ความเข้าใจเชิงลึก, การสนทนาอย่างมีสาระสำคัญ, ความรู้ที่เป็นปัญหาม อภิภาษา,

ความเชื่อมโยง: การบูรณาการความรู้, ความรู้พื้นฐาน, ความเชื่อมโยงกับภายนอก, หลักสูตรโดยใช้ปัญหาเป็นฐาน

สภาพแวดล้อมห้องเรียนที่สนับสนุน: การสอนถูกควบคุมหรือกำหนดโดยนักเรียน, การสนับสนุนทางสภาพแวดล้อมและสังคม, การมีส่วนร่วม, เกณฑ์การประเมินผลที่ชัดเจน, การกำกับตนเอง

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การยอมรับความแตกต่าง: ความรู้เกี่ยวกับวัฒนธรรม, การเข้าถึงนักเรียนอย่างทั่วถึง, การบรรยายตามลำดับเหตุการณ์, เกลักษณ์กลุ่ม, ความเป็นพลเมือง

Table 6: ตารางสรุปและอธิบายแต่ละด้านของศาสตร์การสอนที่มีผลิตภาพ (The State of Queensland, Department of Education, 2002).

Intellectual quality Higher order thinking Deep knowledge Substantive conversation	 Are students using higher-order thinking operations within a critical framework? Does the lesson cover operational fields in any depth, detail or level of

	specificity?
Knowledge problematic	Does classroom talk lead to sustained conversational dialogue between students, and between teacher and students, to create or negotiate understanding of subject matter?
Metalanguage	Are students critically examining texts, ideas and knowledge?
	Are aspects of language, grammar and technical vocabulary being given prominence?
Connectedness	
Knowledge integration	Does the lesson integrate a range of subject areas?
Background knowledge	Are links with students' background knowledge made explicit?
Connectedness to the world	Is the lesson, activity or task connected to competencies or concerns beyond the classroom?
Problem based curriculum	Is there a focus on identifying and solving intellectual and/or real-world problems?
Supportive classroom environment	
Student direction	Do students determine specific activities or outcomes of the lesson?
Social support	Is the classroom characterized by an atmosphere of mutual respect and support between teacher and students, and among students?
Academic engagement	Are students engaged and on-task during the lesson?
Explicit quality performance criteria	Are the criteria for judging the range of student performance made explicit?
Self-regulation	Is the direction of student behavior implicit and self-regulatory?
Recognition of difference	Are non-dominant cultures valued?
Cultural knowledge	
Inclusivity	Are deliberate attempts made to ensure that students from diverse backgrounds are actively engaged in learning?
Narrative	Is the style of teaching principally narrative or is it expository?
Group identity	Does the teaching build a sense of community and identity?
Active citizenship	Are attempts made to encourage active citizenship within the classroom?

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Expert's Validation for Research Instrument

This questionnaire is part of "Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies" Dissertation.

Indications

1) This research is part of Doctoral of Education in Educational Administration, Department of Educational Policy, Management and Leadership, Faculty of Education, Chulalongkorn University. The objective of this research is to develop " Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies".

2) There are 2 sets of questionnaire; one is for School Administrator and one is for out-of-field teacher.

3) The researcher aims to study current state and desirable state of Private School Teacher Development Based on the Concepts of TPACK and Productive Pedagogies. Please answer all the questions in each part as accurately as possible for the benefits of the studies in educational field. Your answers will only be using for the purpose of the research and the informants will not be disclose.

4) The questionnaire will be divide into 3 parts as follows:

Part 1 School's background information (For Administrator): The researcher will use checklist and questionnaire questions to inquire about the information such as school's name, Educational stages offered, total number of teacher, number of out-of-field teacher; subjects teaching and teaching levels.

Part 2 Personal Information (For educational Administrator and out-of-field teachers): The research will use checklist and questionnaire questions to inquire about informant's gender, age, Educational background, work position, work experience, and teaching levels.

Part 3 Current state and desirable state information on private school teacher development based on the concepts of TPACK and productive pedagogies (For educational Administrator and out-of-field teachers): The researcher will use rating scale (Rating scale of 5) to inquire about the information.

Thank you very much for contributing your time and effort in validating this questionnaire questions.

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จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

Part 1 School's Background Information: The Index of Item Objective Congruency (IOC) evaluation of instrument.

Please evaluate content validity of each item of questions on research questionnaire by giving the components a rating as follows.

+1 The item of questions is clearly measuring

0 The item of questions is unclearly measuring

-1 The item of questions is clearly not measuring

Part 1 School's Background Information (For Administrator)	**Your Opinions**			
	Congruent +1	Questionable 0	Incongruent -1	Comments
1. School Name				
2. Educational Stages Offered				
3. Number of teachers in your school				
4. Number of out-of-field teachers (Non educational field)				
5. Number of out-of-field teachers (Educational Field but assigned to teach other subjects)				
6. Please specify the subjects and teaching levels that have the most out-of-field teachers to the least. 6.1 Subject_____Levels_____ 6.2 Subject_____Levels_____ 6.3 Subject_____Levels_____ 6.4 Subject_____Levels_____ 6.5 Subject_____Levels_____				
7. School size 7.1 small (1-499 students) 7.2medium (500-1,499 students)				

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

7.3 Large (1,500-2,499 students) 7.4 Extra Large (2,500 students)				
8. Geographical Locations 8.1 Central 8.2 North 8.3 Northeast 8.4 South				

Part 2 Personal Information: The Index of Item Objective Congruency (IOC) evaluation of instrument.

Please evaluate content validity of each item of questions on research questionnaire by giving the components a rating as follows.

+1 The item of questions is clearly measuring
0 The item of questions is unclearly measuring
-1 The item of questions is clearly not measuring

Part 2 Personal Information	Your Opinions			
	Congruent +1	Questionable 0	Incongruent -1	Comments
1. Gender 1.1 Male 1.2 Female				
2. Age (More than 6 months will be count as 1 year) 2.1 Less than 25 years old 2.2 26-30 years old 2.3 31-35 years old 2.4 36-40 years old 2.5 41-45 years old 2.6 46 years old or above				
3. Highest Education 3.1 Bachelor's degree of_____Major_____ 3.2 Master's degree of_____Major_____ 3.3 Doctoral's degree of_____Major_____ 3.4 Others (Please specify)_____				
4. Current Work Position 4.1 School Director 4.2 School Principal 4.3 School Manager 4.4 Vice Principal 4.5 Head of Department___ 4.6 Teacher: Subject_____Levels_____				

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5. Work Experience (more than 6 months will be count as 1 year) 5.1 Less than 6 months 5.2 6 months- 1 year 5.3 1-2 years 5.4 2-5 years 5.5 5-10 years 5.6 More than 10 years				

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Part 3 Current state and desirable state information on private school teacher development based on the concepts of TPACK and productive pedagogies: The Index of Item Objective Congruency (IOC) evaluation of instrument.

Please evaluate content validity of each item of questions on research questionnaire by giving the components a rating as follows.

+1 The item of questions is clearly measuring

0 The item of questions is unclearly measuring

-1 The item of questions is clearly not measuring

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Your Opinions			
	Congruent +1	Questionable 0	Incongruent -1	Comments
Teacher Development by Transmission: Training Model				
1. The school uses the training model in developing teachers on productive pedagogies in intellectual quality aspect as follows:				
1.1 Higher order thinking				
1.3 Deep knowledge				
1.4 Deep understanding				
1.5 Substantive conversation				
1.6 Knowledge problematic				
1.7 Metalanguage				
2. The school uses the training model in developing teachers on productive pedagogies in connectedness aspect as follows:				
2.1 Knowledge integration				
2.2 Background knowledge				
2.3 Connectedness to the world				
2.4 Problem based curriculum				
3. The school uses the training model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:				
3.1 Student control				
3.2 Social support				
3.3 Engagement				
3.4 Explicit criteria				
3.5 Self-regulation				
4. The school uses the training model in developing teachers on productive pedagogies in recognition of difference aspect as follows:				
4.1 Cultural knowledge				
4.2 Inclusivity				
4.3 Narrative				
4.4 Group identity				
4.5 Citizenship				
5. The school uses the training model in developing teachers on technological pedagogical content knowledge as follows:				
5.1 Content knowledge				
5.2 Pedagogical knowledge				
5.3 Technological knowledge				
5.4 Pedagogical content knowledge				
5.5 Technological content knowledge				
5.6 Technological pedagogical				

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The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Your Opinions			
	Congruent +1	Questionable 0	Incongruent -1	Comments
knowledge				
5.7 Technological pedagogical content knowledge				
Teacher Development by Transmission: Award-Bearing Model 6. The school uses the award-bearing model in developing teachers on productive pedagogies in intellectual quality aspect as follows:				
6.1 Higher order thinking				
6.2 Deep knowledge				
6.3 Deep understanding				
6.4 Substantive conversation				
6.5 Knowledge problematic				
6.6 Metalanguage				
7. The school uses the award-bearing model in developing teachers on productive pedagogies in connectedness aspect as follows:				
7.1 Knowledge integration				
7.2 Background knowledge				
7.3 Connectedness to the world				
7.4 Problem based curriculum				
8. The school uses the award-bearing model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:				
8.1 Student control				
8.2 Social support				
8.3 Engagement				
8.4 Explicit criteria				
8.5 Self-regulation				
9. The school uses the award-bearing model in developing teachers on productive pedagogies in recognition of difference aspect as follows:				
9.1 Cultural knowledge				
9.2 Inclusivity				
9.3 Narrative				
9.4 Group identity				
9.5 Citizenship				
10. The school uses the award-bearing model in developing teachers on technological pedagogical content knowledge as follows:				
10.1 Content knowledge				
10.2 Pedagogical knowledge				
10.3 Technological knowledge				
10.4 Pedagogical content knowledge				
10.5 Technological content knowledge				
10.6 Technological pedagogical knowledge				
10.7 Technological pedagogical content knowledge				
Teacher Development by Transmission: Deficit Model 11. The school uses the deficit model in developing teachers on productive pedagogies in intellectual quality aspect as follows:				
11.1 Higher order thinking				

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The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Your Opinions			
	Congruent +1	Questionable 0	Incongruent -1	Comments
11.2 Deep knowledge				
11.3 Deep understanding				
11.4Substantive conversation				
11.5 Knowledge problematic				
11.6 Metalanguage				
12. The school uses the deficit model in developing teachers on productive pedagogies in connectedness aspect as follows:				
12.1 Knowledge integration				
12.2 Background knowledge				
12.3 Connectedness to the world				
12.4 Problem based curriculum				
13. The school uses the deficit model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:				
13.1. Student control				
13.2. Social support				
13.3. Engagement				
13.4. Explicit criteria				
13.5. Self-regulation				
14. The school uses the deficit model in developing teachers on productive pedagogies in recognition of difference aspect as follows:				
14.1. Cultural knowledge				
14.2. Inclusivity				
14.3. Narrative				
14.4. Group identity				
14.5. Citizenship				
15. The school uses the deficit model in developing teachers on technological pedagogical content knowledge as follows:				
15.1 Content knowledge				
15.2 Pedagogical knowledge				
15.3 Technological knowledge				
15.4 Pedagogical content knowledge				
15.5 Technological content knowledge				
15.6 Technological pedagogical knowledge				
15.7 Technological pedagogical content knowledge				
Teacher Development by Transmission: Cascade Model 16. The school uses the cascade model in developing teachers on productive pedagogies in intellectual quality aspect as follows:				
16.1 Higher order thinking				
16.2 Deep knowledge				
16.3 Deep understanding				
16.4 Substantive conversation				
16.5 Knowledge problematic				
16.6 Metalanguage				

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Your Opinions			
	Congruent +1	Questionable 0	Incongruent -1	Comments
17. The school uses the cascade model in developing teachers on productive pedagogies in connectedness aspect as follows:				
17.1 Knowledge integration				
17.2 Background knowledge				
17.3 Connectedness to the world				
17.4 Problem based curriculum				
18. The school uses the cascade model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:				
18.1 Student control				
18.2 Social support				
18.3 Engagement				
18.4 Explicit criteria				
18.5 Self-regulation				
19. The school uses the cascade model in developing teachers on productive pedagogies in recognition of difference aspect as follows:				
19.1 Cultural knowledge				
19.2 Inclusivity				
19.3 Narrative				
19.4 Group identity				
19.5 Citizenship				
20. The school uses the cascade model in developing teachers on technological pedagogical content knowledge as follows:				
20.1 Content knowledge				
20.2 Pedagogical knowledge				
20.3 Technological knowledge				
20.4 Pedagogical content knowledge				
20.5 Technological content knowledge				
20.6 Technological pedagogical knowledge				
20.7 Technological pedagogical content knowledge				
Teacher Development by Transitional: Standard-Based Model 21. The school uses the standard-based model in developing teachers on productive pedagogies in intellectual quality aspect as follows:				
21.1 Higher order thinking				
21.2 Deep knowledge				
21.3 Deep understanding				
21.4Substantive conversation				
21.5 Knowledge problematic				
21.6 Metalanguage				
22. The school uses the standard-based model in developing teachers on productive pedagogies in connectedness aspect as follows:				
22.1 Knowledge integration				
22.2 Background knowledge				
22.3 Connectedness to the world				
22.4 Problem based curriculum				

he Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Your Opinions			
	Congruent +1	Questionable 0	Incongruent -1	Comments
23. The school uses the standard-based model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:				
23.1 Student control				
23.2 Social support				
23.3 Engagement				
23.4 Explicit criteria				
23.5 Self-regulation				
24. The school uses the standard-based model in developing teachers on productive pedagogies in recognition of difference aspect as follows:				
24.1 Cultural knowledge				
24.2 Inclusivity				
24.3 Narrative				
24.4 Group identity				
24.5 Citizenship				
25. The school uses the standard-based model in developing teachers on technological pedagogical content knowledge as follows:				
25.1 Content knowledge				
25.2 Pedagogical knowledge				
25.3 Technological knowledge				
25.4 Pedagogical content knowledge				
25.5 Technological content knowledge				
25.6 Technological pedagogical knowledge				
25.7 Technological pedagogical content knowledge				
Teacher Development by Transitional: Coaching/Mentoring Model 26. The school uses the coaching/mentoring model in developing teachers on productive pedagogies in intellectual quality aspect as follows:				
26.1 Higher order thinking				
26.2 Deep knowledge				
26.3 Deep understanding				
26.4 Substantive conversation				
26.5 Knowledge problematic				
26.6 Metalanguage				
27. The school uses the coaching/mentoring model in developing teachers on productive pedagogies in connectedness aspect as follows:				
27.1 Knowledge integration				
27.2 Background knowledge				
27.3 Connectedness to the world				
27.4 Problem based curriculum				
28. The school uses the coaching/mentoring model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:				
28.1 Student control				
28.2 Social support				
28.3 Engagement				
28.4 Explicit criteria				
28.5 Self-regulation				

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Your Opinions			
	Congruent +1	Questionable 0	Incongruent -1	Comments
29. The school uses the coaching/mentoring model in developing teachers on productive pedagogies in recognition of difference aspect as follows:				
29.1 Cultural knowledge				
29.2 Inclusivity				
29.3 Narrative				
29.4 Group identity				
29.5 Citizenship				
30. The school uses the coaching/mentoring model in developing teachers on technological pedagogical content knowledge as follows:				
30.1 Content knowledge				
30.2 Pedagogical knowledge				
30.3 Technological knowledge				
30.4 Pedagogical content knowledge				
30.5 Technological content knowledge				
30.6 Technological pedagogical knowledge				
30.7 Technological pedagogical content knowledge				
Teacher Development by Transitional: Community of Practice Model 31. The school uses the community of practice model in developing teachers on productive pedagogies in intellectual quality aspect as follows:				
31.1 Higher order thinking				
31.2 Deep knowledge				
31.3 Deep understanding				
31.4 Substantive conversation				
31.5 Knowledge problematic				
31.6 Metalanguage				
32. The school uses the community of practice model in developing teachers on productive pedagogies in connectedness aspect as follows:				
32.1 Knowledge integration				
32.2 Background knowledge				
32.3 Connectedness to the world				
32.4 Problem based curriculum				
33. The school uses the community of practice model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:				
33.1 Student control				
33.2 Social support				
33.3 Engagement				
33.4 Explicit criteria				
33.5 Self-regulation				
34. The school uses the community of practice model in developing teachers on productive pedagogies in recognition of difference aspect as follows:				
34.1 Cultural knowledge				
34.2 Inclusivity				
34.3 Narrative				
34.4 Group identity				

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The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Your Opinions			
	Congruent +1	Questionable 0	Incongruent -1	Comments
35. The school uses the community of practice model in developing teachers on technological pedagogical content knowledge as follows:				
35.1 Content knowledge				
35.2 Pedagogical knowledge				
35.3 Technological knowledge				
35.4 Pedagogical content knowledge				
35.5 Technological content knowledge				
35.6 Technological pedagogical knowledge				
35.7 Technological pedagogical content knowledge				
Teacher Development by Transformative: Action Research Model 36. The school uses the action research model in developing teachers on productive pedagogies in intellectual quality aspect as follows:				
36.1 Higher order thinking				
36.2 Deep knowledge				
36.3 Deep understanding				
36.4 Substantive conversation				
36.5 Knowledge problematic				
36.6 Metalanguage				
37. The school uses the action research model in developing teachers on productive pedagogies in connectedness aspect as follows:				
37.1 Knowledge integration				
37.2 Background knowledge				
37.3 Connectedness to the world				
37.4 Problem based curriculum				
38. The school uses the action research model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:				
38.1 Student control				
38.2 Social support				
38.3 Engagement				
38.4 Explicit criteria				
38.5 Self-regulation				
39. The school uses the action research model in developing teachers on productive pedagogies in recognition of difference aspect as follows:				
39.1 Cultural knowledge				
39.2 Inclusivity				
39.3 Narrative				
39.4 Group identity				
39.5 Citizenship				
40. The school uses the action research model in developing teachers on technological pedagogical content knowledge as follows:				
40.1 Content knowledge				
40.2 Pedagogical knowledge				
40.3 Technological knowledge				
40.4 Pedagogical content knowledge				

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The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Your Opinions			
	Congruent +1	Questionable 0	Incongruent -1	Comments
40.5 Technological content knowledge				
40.6 Technological pedagogical knowledge				
40.7 Technological pedagogical content knowledge				
Teacher Development by Transformative: Transformative Model 41. The school uses the transformative model in developing teachers on productive pedagogies in intellectual quality aspect as follows:				
41.1 Higher order thinking				
41.2 Deep knowledge				
41.3 Deep understanding				
41.4 Substantive conversation				
41.5 Knowledge problematic				
41.6 Metalanguage				
42. The school uses the transformative model in developing teachers on productive pedagogies in connectedness aspect as follows:				
42.1 Knowledge integration				
42.2 Background knowledge				
42.3 Connectedness to the world				
42.4 Problem based curriculum				
43. The school uses the transformative model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:				
43.1 Student control				
43.2 Social support				
43.3 Engagement				
43.4 Explicit criteria				
43.5 Self-regulation				
44. The school uses the transformative model in developing teachers on productive pedagogies in recognition of difference aspect as follows:				
44.1 Cultural knowledge				
44.2 Inclusivity				
44.3 Narrative				
44.4 Group identity				
44.5 Citizenship				
45. The school uses the transformative model in developing teachers on technological pedagogical content knowledge as follows:				
45.1 Content knowledge				
45.2 Pedagogical knowledge				
45.3 Technological knowledge				
45.4 Pedagogical content knowledge				
45.5 Technological content knowledge				
45.6 Technological pedagogical knowledge				
45.7 Technological pedagogical content knowledge				

Thank you very much for contributing your time and effort in validating this questionnaire questions.

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The Evaluation of the Conceptual Framework Expert's Validation Form

เรื่อง: รูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ

Title: Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies

Items	Evaluation			IOC
	Congruent	Questionable	Incongruent	
	Frequency	Frequency	Frequency	
Teacher Development Models				
1. Transmission Model	4	0	0	1.00
1.1 The Training Model	4	0	0	1.00
1.2 The Award-bearing Model	4	0	0	1.00
1.3 The Deficit Model	4	0	0	1.00
1.4 The Cascade Model	4	0	0	1.00
2. Transitional Model	4	0	0	1.00
2.1 The Standard-Based Model	4	0	0	1.00
2.2 The Coaching/ Mentoring Model	4	0	0	1.00
2.3 The Community of Practice Model	4	0	0	1.00
3. Transformative	4	0	0	1.00
3.1 The Action Research Model	4	0	0	1.00
3.2 The Transformative Model	4	0	0	1.00
Productive Pedagogies				
1. Intellectual Quality	4	0	0	1.00
1.1 Higher Order Thinking	4	0	0	1.00
1.2 Deep Knowledge	4	0	0	1.00
1.3 Deep Understanding	4	0	0	1.00
1.4 Substantive Conversation	4	0	0	1.00
1.5 Knowledge Problematic	4	0	0	1.00
1.6 Metalanguage	4	0	0	1.00
2. Connectedness	4	0	0	1.00
2.1 Knowledge Integration	4	0	0	1.00
2.2 Background Knowledge	4	0	0	1.00
2.3 Connectedness to the World	4	0	0	1.00
2.4 Problem-based Curriculum	4	0	0	1.00

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Items	Evaluation			IOC
	Congruent	Questionable	Incongruent	
	Frequency	Frequency	Frequency	
3. Supportive Classroom Environment	4	0	0	1.00
3.1 Student Control	4	0	0	1.00
3.2 Social Support	4	0	0	1.00
3.3 Engagement	4	0	0	1.00
3.4 Explicit Criteria	4	0	0	1.00
3.5 Self-regulation	4	0	0	1.00
4. Recognition of Difference	4	0	0	1.00
4.1 Cultural Knowledge	4	0	0	1.00
4.2 Inclusivity	4	0	0	1.00
4.3 Narrative	4	0	0	1.00
4.4 Group Identity	4	0	0	1.00
4.5 Citizenship	4	0	0	1.00
Content areas of Technological Pedagogical Content Knowledge				
1. Content Knowledge	4	0	0	1.00
2. Pedagogical Knowledge	4	0	0	1.00
3. Technological Knowledge	4	0	0	1.00
4.Pedagogical Content Knowledge	4	0	0	1.00
5.Technological Content Knowledge	4	0	0	1.00
6. Technological Pedagogical Knowledge	4	0	0	1.00
7.Technological Pedagogical Content Knowledge	4	0	0	1.00

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Comments.....
.....
.....

Expert's Signature.....

( )

Date.....

The Evaluation of the Research Questionnaire

แบบตรวจสอบคุณภาพเครื่องมือที่ใช้ในงานวิจัย

เรื่อง รูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ

คำชี้แจง

1. การวิจัยครั้งนี้เป็นส่วนหนึ่งของการศึกษาหลักสูตรครุศาสตร์ดุษฎีบัณฑิต สาขาวิชาบริหารการศึกษา ภาควิชานโยบายการจัดการและความเป็นผู้นำทางการศึกษา คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัยโดยมีวัตถุประสงค์เพื่อพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ

2. แบบสอบถามมีทั้งหมด 2 ฉบับ เป็นแบบสอบถามสำหรับ ผู้บริหารโรงเรียน จำนวน 1 ฉบับ อาจารย์ผู้สอนที่สอนไม่ตรงเอกหรือจบไม่ตรงเอกจำนวน 1 ฉบับ

3. ผู้วิจัยต้องการศึกษาความคิดเห็นเกี่ยวกับสภาพปัจจุบันและสภาพที่พึงประสงค์ของการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ ขอความกรุณาท่านโปรดช่วยตอบแบบสอบถามทุกขั้นตอน ทุกข้อ ตามสภาพจริง ให้ตรงกับความคิดเห็นของท่านให้มากที่สุดเพราะข้อมูลที่เป็นจริงของท่านจะมีคุณค่าอย่างยิ่งต่องานวิจัย และจะเป็นประโยชน์ต่อการพัฒนาคุณภาพการศึกษาของประเทศไทยในภาพรวมต่อไป การตอบแบบสอบถามครั้งนี้จะไม่มีผลกระทบต่อท่านและการปฏิบัติงานของท่านแต่ประการใด เพราะผู้วิจัยจะนำไปวิเคราะห์และนำเสนอผลในภาพรวมเท่านั้น

4. แบบสอบถามชุดนี้แบ่งออกเป็น 2 ตอน ประกอบด้วย

ตอนที่ 1 ข้อมูลพื้นฐานของโรงเรียน (เฉพาะผู้บริหาร) โดยใช้แบบตรวจสอบรายการ (Checklist) และแบบสอบถาม (Questionnaire) ในส่วนข้อมูลของโรงเรียนประกอบด้วย ชื่อโรงเรียน ระดับชั้นที่ทำการเปิดสอน จำนวนครูในสถานศึกษา จำนวนครูที่เรียนสาขาอื่น จำนวนครูที่สอนไม่ตรงเอก วิชาที่สอนไม่ตรงเอกและระดับชั้น

ตอนที่ 2 ข้อมูลพื้นฐานของผู้ตอบแบบสอบถาม (ผู้บริหารและครู) โดยใช้แบบตรวจสอบรายการ (Checklist) และแบบสอบถาม (Questionnaire) ในส่วนขอมูลของผู้ตอบแบบสอบถาม ประกอบด้วย เพศ อายุ วุฒิการศึกษาสูงสุด ตำแหน่งปัจจุบัน ระยะเวลาในการทำงานและระดับชั้นที่ทำการสอน

ตอนที่ 3 ข้อมูลเกี่ยวกับสภาพปัจจุบันและสภาพที่พึงประสงค์ของการพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพโดยใช้แบบสอบถามแบบมาตราส่วนประมาณค่า (Rating Scale) 5 ระดับ

ผู้วิจัยขอขอบพระคุณท่านผู้ทรงเป็นอย่างสูงที่กรุณาให้ความอนุเคราะห์เสียสละเวลาของท่านให้ความร่วมมือ ในการตอบแบบสอบถามเพื่อการวิจัยครั้งนี้เป็นอย่างดียิ่ง

นายณัฐวุฒิ เกตุไชโย
นิสิตปริญญาดุษฎีบัณฑิตสาขาวิชาบริหารการศึกษา
ภาควิชานโยบายการจัดการและความเป็นผู้นำทางการศึกษา
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ตอนที่ 1 การประเมินข้อคำถามเกี่ยวกับข้อมูลพื้นฐานของโรงเรียน (เฉพาะผู้บริหาร)

การประเมินค่าดัชนีความสอดคล้อง (IOC: Index of Item Objective Congruence)

คำชี้แจง กรุณาพิจารณาความสอดคล้องระหว่างข้อคำถามกับตัวแปร โดยใส่เครื่องหมาย ✓ ลงในช่อง □ ที่ตรงกับความคิดเห็นของท่าน พร้อมทั้งเขียนข้อเสนอแนะที่เป็นประโยชน์ในการนาไปพิจารณาปรับปรุงต่อไป

+1 หมายถึง แน่ใจ ว่าข้อคำถามนั้นสอดคล้องกับนิยามตัวแปรที่ระบุไว้

0 หมายถึง ไม่แน่ใจ ว่าข้อคำถามนั้นสอดคล้องกับนิยามตัวแปรที่ระบุไว้

-1 หมายถึง แน่ใจ ว่าข้อคำถามนั้นไม่สอดคล้องกับนิยามตัวแปรที่ระบุไว้

ตอนที่ 1 ข้อมูลพื้นฐานของโรงเรียน (เฉพาะผู้บริหาร)	ความคิดเห็นของผู้ทรง				
	1B	2V	3M	4K	ข้อเสนอแนะ
1.ชื่อโรงเรียน	1	0	1	-1	0.25 1.ควรใช้ชื่อรหัสในข้อ 1-5 เกี่ยวกับความมั่นคง 2.โรงเรียนอาจไม่ต้องการเปิดเผยข้อมูล เปลี่ยนเป็นหลักสูตร
2. ระดับชั้นที่เปิดสอน	1	0	1	1	0.75
3. จำนวนครูในสถานศึกษา	1	0	1	1	0.75
4. จำนวนครูที่เรียนสาขาอื่น (ไม่ได้เรียนครุศาสตร์หรือศึกษาศาสตร์	1	0	0	0	0.25 แค่ไหนที่ว่าเรียนหรือไม่เรียนสอนประถมศึกษาแบบประจำชั้นจะไม่ตรงทั้งหมด?
5. จำนวนครูที่สอนไม่ตรงเอก (เรียนครุศาสตร์หรือศึกษาศาสตร์แต่สอนในวิชาที่ไม่ตรงเอก)	1	0	0	0	0.25

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

ตอนที่ 1 ข้อมูลพื้นฐานของโรงเรียน (เฉพาะผู้บริหาร)	ความคิดเห็นของผู้ทรง				
	1B	2V	3M	4K	ข้อเสนอแนะ
6. โปรดระบุรายวิชาและระดับชั้นที่โรงเรียนของท่านมีครูสอนไม่ตรงเอกมากที่สุดไปน้อยที่สุด 6.1 ชื่อวิชา_____ สอนระดับชั้น_____ ชื่อวิชา_____ สอนระดับชั้น_____ 6.2 ชื่อวิชา_____ สอนระดับชั้น_____ ชื่อวิชา_____ สอนระดับชั้น_____ 6.3 ชื่อวิชา_____ สอนระดับชั้น_____ ชื่อวิชา_____ สอนระดับชั้น_____ 6.4 ชื่อวิชา_____ สอนระดับชั้น_____ ชื่อวิชา_____ สอนระดับชั้น_____ 6.5 ชื่อวิชา_____ สอนระดับชั้น_____ ชื่อวิชา_____ สอนระดับชั้น_____ 6.6 ชื่อวิชา_____ สอนระดับชั้น_____ ชื่อวิชา_____ สอนระดับชั้น_____	1	1	1	0	0.75 ข้อมูลตรงนี้อาจทำให้ผู้บริการไม่ตอบเนื่องจากไม่มีเวลาค้นข้อมูล ถ้าจำเป็นต้องใช้อาจแยกรายวิชาและช่วงชั้น เช่น รายวิชาของท่านที่มีครูสอนไม่ตรงเอกมากที่สุดและน้อยที่สุด ระดับช่วงชั้นที่มีครูสอนไม่ตรงเอกมากที่สุดและน้อยที่สุด
7. ขนาดของโรงเรียน (ตามจำนวนนักเรียน) 7.1 ขนาดเล็ก (1-499 คน) 7.2 ขนาดกลาง (500-1,499 คน) 7.3 ขนาดใหญ่ (1,500-2,499 คน) 7.4 ขนาดใหญ่พิเศษ (2,500 คนขึ้นไป)	1	1	0	1	0.75 จะใช้เกณฑ์ของหน่วยงานใดหรือผู้วิจัยกำหนดเอง
8. ภูมิภาค 8.1 ภาคกลาง	1	1	0	1	0.75 มีอ้างอิงไหมหรือยึดเกณฑ์ของ

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

ตอนที่ 1 ข้อมูลพื้นฐานของโรงเรียน (เฉพาะผู้บริหาร)	ความคิดเห็นของผู้ทรง				
	1B	2V	3M	4K	ข้อเสนอแนะ
8.2 ภาคเหนือ 8.3 ภาคตะวันออกเฉียงเหนือ 8.4 ภาคใต้					กระทรวง

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

ตอนที่ 2 การประเมินข้อคำถามเกี่ยวกับข้อมูลพื้นฐานของผู้ตอบแบบสอบถาม (เฉพาะผู้บริหาร)

การประเมินค่าดัชนีความสอดคล้อง (IOC: Index of Item Objective Congruence)

คำชี้แจง กรุณาพิจารณาความสอดคล้องระหว่างข้อคำถามกับตัวแปร โดยใส่เครื่องหมาย ✓ ลงในช่อง □ ที่ตรงกับความคิดเห็นของท่าน พร้อมทั้งเขียนข้อเสนอแนะที่เป็นประโยชน์ในการนาไปพิจารณาปรับปรุงต่อไป

+1 หมายถึง แน่ใจ ว่าข้อคำถามนั้นสอดคล้องกับนิยามตัวแปรที่ระบุไว้

0 หมายถึง ไม่แน่ใจ ว่าข้อคำถามนั้นสอดคล้องกับนิยามตัวแปรที่ระบุไว้

-1 หมายถึง แน่ใจ ว่าข้อคำถามนั้นไม่สอดคล้องกับนิยามตัวแปรที่ระบุไว้

ตอนที่ 2 ข้อมูลพื้นฐานของผู้ตอบแบบสอบถาม	ความคิดเห็นของผู้ทรง				
	1	2	3	4	ข้อเสนอแนะ
1. เพศ 1.1 ชาย 1.2 หญิง	1	1	1	1	
2. อายุ (เศษของอายุปีตั้งแต่ 6 เดือนขึ้นไปนับเป็น 1 ปี) 2.1 ไม่เกิน 25 ปี 2.2 26-30 ปี 2.3 31-35 ปี 2.4 36-40 ปี 2.5 41-45 ปี 2.6 46 ปีขึ้นไป	1	1	1	1	
3. วุฒิการศึกษาสูงสุด 3.1 ปริญญาตรีวุฒิ_____ สาขา_____วิชาเอก_____ 3.2 ปริญญาโทวุฒิ_____ สาขา_____วิชาเอก_____ 3.3 ปริญญาเอกวุฒิ_____ สาขา_____วิชาเอก_____ อื่นๆ_____	1	1	0	1	0.75 ไม่เข้าใจสาขาและวิชาเอก
4. ตำแหน่งปัจจุบัน 4.1 ผู้รับใบอนุญาต 4.2 ผู้อำนวยการ 4.3 ผู้จัดการ 4.4 รองผู้อำนวยการ 4.5 หัวหน้าฝ่าย_____ 4.6 ครูผู้สอนวิชา_____ระดับชั้น_____	1	1	1	1	1 ตำแหน่งอื่นๆอาจมีได้ จะกรอกที่ไหน

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

ตอนที่ 2 ข้อมูลพื้นฐานของผู้ตอบแบบสอบถาม	ความคิดเห็นของผู้ทรง				
	1	2	3	4	ข้อเสนอแนะ
5. จำนวนครูที่สอนไม่ตรงเอก (เรียนครุศาสตร์หรือศึกษาศาสตร์แต่สอนในวิชาที่ไม่ตรงเอก)	1	1	-1	-1	0 1.นิยามไม่ตรงเอกให้ชัดเจน เช่น จบ.ป.ตรีการศึกษาประถมศึกษา สอนภาษาไทย หรือสอนแบบประจำชั้นทุกวิชา ตรงหรือไม่ตรง หรือจบเอกฟิสิกส์ สอนวิทย์ ตรงหรือไม่ตรง 2. ผู้บริหารตอบตอนที่ 1 แล้ว
6. โปรดระบุรายวิชาและระดับชั้นที่โรงเรียนของท่านมีครูสอนไม่ตรงเอกมากที่สุดไปน้อยที่สุด 6.1 ชื่อวิชา_____ สอนระดับชั้น_____ 6.2 ชื่อวิชา_____ สอนระดับชั้น_____ 6.3 ชื่อวิชา_____ สอนระดับชั้น_____ 6.4 ชื่อวิชา_____ สอนระดับชั้น_____ 6.5 ชื่อวิชา_____ สอนระดับชั้น_____ 6.6 ชื่อวิชา_____ สอนระดับชั้น_____	1	1	0	-1	0.25 1.ตรงนี้จะได้ข้อมูลครบถ้วนหรือไม่ เพราะถ้ามีจำนวนมากจะกรอกยากมาก แต่หากถามว่า 3 ลำดับที่สอนไม่ตรงกับวิชาเอกจะง่ายขึ้น 2. ผู้บริหารตอบตอนที่ 1 แล้ว
7. ระยะเวลาในการทำงาน (เศษของปีตั้งแต่ 6 เดือนขึ้นไปนับเป็น 1 ปี) 7.1 น้อยกว่า 6 เดือน 7.2 6 เดือน – 1 ปี 7.3 1-2ปี 7.4 2-5 ปี 7.5 5-10 ปี 7.6 มากกว่า 10 ปี	1	1	1	1	1

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

ตอนที่ 3 การประเมินข้อคำถามเกี่ยวกับสภาพปัจจุบันและสภาพที่พึงประสงค์ของรูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ

การประเมินค่าดัชนีความสอดคล้อง (IOC: Index of Item Objective Congruence)

คำชี้แจง กรุณาพิจารณาความสอดคล้องระหว่างข้อคำถามกับตัวแปร โดยใส่เครื่องหมาย √ ลงในช่อง □ ที่ตรงกับความคิดเห็นของท่าน พร้อมทั้งเขียนข้อเสนอแนะที่เป็นประโยชน์ในการนาไปพิจารณาปรับปรุงต่อไป

+1 หมายถึง แน่ใจ ว่าข้อคำถามนั้นสอดคล้องกับนิยามตัวแปรที่ระบุไว้

0 หมายถึง ไม่แน่ใจ ว่าข้อคำถามนั้นสอดคล้องกับนิยามตัวแปรที่ระบุไว้

-1 หมายถึง แน่ใจ ว่าข้อคำถามนั้นไม่สอดคล้องกับนิยามตัวแปรที่ระบุไว้

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	ความคิดเห็นของผู้ทรง				
	1B	2V	3M	4k	ข้อเสนอแนะ
การพัฒนาครูโดยการถ่ายทอด: รูปแบบการฝึกอบรม					
1. โรงเรียนมีการใช้รูปแบบการฝึกอบรมในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านคุณภาพทางปัญญาดังต่อไปนี้					
1.1 ทักษะการคิดขั้นสูง	1	1	1	1	1
1.2 ความรู้เชิงลึก	1	1	1	1	1
1.3 ความเข้าใจเชิงลึก	1	1	1	1	1
1.4 การสนทนาอย่างมีสาระสำคัญ	1	1	1	1	1
1.5 ความรู้ที่เป็นปัญหา	1	1	1	0	0.75
1.6 การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์อย่างลึกซึ้ง	1	1	1	0	0.75
2. โรงเรียนมีการใช้รูปแบบการฝึกอบรมในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านความเชื่อมโยงดังต่อไปนี้					
2.1 การบูรณาการความรู้	1	1	1	1	1
2.2 ความรู้พื้นฐาน	1	1	1	1	1
2.3 ความเชื่อมโยงกับภายนอก	1	1	1	0	0.75
2.4 หลักสูตรโดยใช้ปัญหาเป็นฐาน	1	1	1	1	
3. โรงเรียนมีการใช้รูปแบบการฝึกอบรมในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านสภาพแวดล้อมห้องเรียนที่สนับสนุนดังต่อไปนี้					
3.1 การสอนถูกควบคุมหรือกำหนดโดยนักเรียน	1	1	1	0	0.75 นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	ความคิดเห็นของผู้ทรง				
	1B	2V	3M	4K	ข้อเสนอแนะ
3.2 การสนับสนุนทางสภาพแวดล้อมและสังคม	1	1	1	1	1
3.3 การมีส่วนร่วม	1	1	1	0	0.75 ระบุให้ชัดเจน
3.4 เกณฑ์การประเมินผลที่ชัดเจน	1	1	1	1	1
3.5 การกำกับตนเอง	1	1	1	1	1
4. โรงเรียนมีการใช้รูปแบบการฝึกอบรมในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านการยอมรับความแตกต่างดังต่อไปนี้					
4.1 ความรู้เกี่ยวกับวัฒนธรรม	1	1	1	1	1
4.2 การเข้าถึงนักเรียนอย่างทั่วถึง	1	1	1	1	1
4.3 การบรรยายตามลำดับเหตุการณ์	1	1	1	1	1
4.4 เอกลักษณ์กลุ่ม	1	1	1	1	1
4.5 ความเป็นพลเมือง	1	1	1	1	1
5. โรงเรียนมีการใช้รูปแบบการฝึกอบรมในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหาดังต่อไปนี้					
5.1 ด้านความรู้ในเนื้อหา	1	1	1	1	1
5.2 ด้านความรู้ในด้านศาสตร์การสอน	1	1	1	1	1
5.3 ด้านความรู้ในด้านเทคโนโลยี	1	1	1	1	1
5.4 ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	1	1	1	1	1
5.5 ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	1	1	1	1	1
5.6 ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	1	1	1	1	1
5.7 ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	1	1	1	1	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	ความคิดเห็นของผู้ทรง				
	1B	2V	3M	4K	ข้อเสนอแนะ
การพัฒนาครูโดยการถ่ายทอด: รูปแบบการเรียนเพิ่มวุฒิ 6. โรงเรียนมีการใช้รูปแบบการเรียนเพิ่มวุฒิในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านคุณภาพทางปัญญาดังต่อไปนี้					
6.1 ทักษะการคิดขั้นสูง	1	1	1	1	1
6.2 ความรู้เชิงลึก	1	1	1	1	1
6.3 ความเข้าใจเชิงลึก	1	1	1	1	1
6.4 การสนทนาอย่างมีสาระสำคัญ	1	1	1	1	1
6.5 ความรู้ที่เป็นปัญหา	1	1	1	0	0.75
6.6 การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์ย่างลึกซึ้ง	1	1	1	0	0.75
7. โรงเรียนมีการใช้รูปแบบการเรียนเพิ่มวุฒิในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านความเชื่อมโยงดังต่อไปนี้					
7.1 การบูรณาการความรู้	1	1	1	1	1
7.2 ความรู้พื้นฐาน	1	1	1	1	1
7.3 ความเชื่อมโยงกับภายนอก	1	1	1	0	0.75
7.4 หลักสูตรโดยใช้ปัญหาเป็นฐาน	1	1	1	1	1
8. โรงเรียนมีการใช้รูปแบบการเรียนเพิ่มวุฒิในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านสภาพแวดล้อมห้องเรียนที่สนับสนุนดังต่อไปนี้					
8.1 การสอนถูกควบคุมหรือกำหนดโดยนักเรียน	1	1	1	0	0.75 นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้
8.2 การสนับสนุนทางสภาพแวดล้อมและสังคม	1	1	1	1	1
8.3 การมีส่วนร่วม	1	1	1	0	0.75 ระบุให้ชัดเจน
8.4 เกณฑ์การประเมินผลที่ชัดเจน	1	1	1	1	1
8.5 การกำกับตนเอง	1	1	1	1	1
9. โรงเรียนมีการพัฒนาครูโดยใช้รูปแบบการเรียนเพิ่มวุฒิในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านการยอมรับความแตกต่างดังต่อไปนี้					
9.1 ความรู้เกี่ยวกับวัฒนธรรม	1	1	1	1	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	ความคิดเห็นของผู้ทรง				
	1B	2V	3M	4K	ข้อเสนอแนะ
9.2 การเข้าถึงนักเรียนอย่างทั่วถึง	1	1	1	1	1
9.3 การบรรยายตามลำดับเหตุการณ์	1	1	1	1	1
9.4 เอกลักษณ์กลุ่ม	1	1	1	1	1
9.5 ความเป็นพลเมือง	1	1	1	1	1
10. โรงเรียนมีการใช้รูปแบบการเรียนเพิ่มวุฒิในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหาดังต่อไปนี้					
10.1. ด้านความรู้ในเนื้อหา	1	1	1	1	1
10.2. ด้านความรู้ในด้านศาสตร์การสอน	1	1	1	1	1
10.3. ด้านความรู้ในด้านเทคโนโลยี	1	1	1	1	1
10.4. ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	1	1	1	1	1
10.5. ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	1	1	1	1	1
10.6. ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	1	1	1	1	1
10.7. ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	1	1	1	1	1

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

การพัฒนาครูโดยการถ่ายทอด: รูปแบบการเติมเต็มสิ่งที่ขาด					
11. โรงเรียนมีการใช้รูปแบบการเติมเต็มสิ่งที่ขาดในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านคุณภาพทางปัญญาดังต่อไปนี้					
11.1 ทักษะการคิดขั้นสูง	1	1	1	1	1
11.2 ความรู้เชิงลึก	1	1	1	1	1
11.3 ความเข้าใจเชิงลึก	1	1	1	1	1
11.4 การสนทนาอย่างมีสาระสำคัญ	1	1	1	1	1
11.5 ความรู้ที่เป็นปัญหา	1	1	1	0	0.75
11.6 การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์ย่างลึกซึ้ง	1	1	1	0	0.75
12. โรงเรียนมีการใช้รูปแบบการเติมเต็มสิ่งที่ขาดในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านความเชื่อมโยงดังต่อไปนี้					
12.1 การบูรณาการความรู้	1	1	1	1	1
12.2 ความรู้พื้นฐาน	1	1	1	1	1
12.3 ความเชื่อมโยงกับภายนอก	1	1	1	0	0.75
12.4 หลักสูตรโดยใช้ปัญหาเป็นฐาน	1	1	1	1	1
13. โรงเรียนมีการใช้รูปแบบการเติมเต็มสิ่งที่ขาดในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านสภาพแวดล้อมห้องเรียนที่สนับสนุนดังต่อไปนี้					
13.1 การสอนถูกควบคุมหรือกำหนดโดยนักเรียน	1	1	1	0	0.75 นักเรียนมีส่วนร่วมในการจัดการเรียนรู้
13.2 การสนับสนุนทางสภาพแวดล้อมและสังคม	1	1	1	1	1
13.3 การมีส่วนร่วม	1	1	1	0	0.75 ระบุให้ชัดเจนว่าอะไร
13.4 เกณฑ์การประเมินผลที่ชัดเจน	1	1	1	1	1
13.5 การกำกับตนเอง	1	1	1	1	1
14. โรงเรียนมีการใช้รูปแบบการเติมเต็มสิ่งที่ขาดในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านการยอมรับความแตกต่างดังต่อไปนี้					
14.1 ความรู้เกี่ยวกับวัฒนธรรม	1	1	1	1	1
14.2 การเข้าถึงนักเรียนอย่างทั่วถึง	1	1	1	1	1

CHULALONGKORN UNIVERSITY

14.3 การบรรยายตามลำดับเหตุการณ์	1	1	1	1	1
14.4 เอกลักษณ์กลุ่ม	1	1	1	1	1
14.5 ความเป็นพลเมือง	1	1	1	1	1
15. โรงเรียนมีการใช้รูปแบบการเรียนเติมเต็มสิ่งที่ขาดในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหาดังต่อไปนี้					
15.1 ด้านความรู้ในเนื้อหา	1	1	1	1	1
15.2 ด้านความรู้ในด้านศาสตร์การสอน	1	1	1	1	1
15.3 ด้านความรู้ในด้านเทคโนโลยี	1	1	1	1	1
15.4 ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	1	1	1	1	1
15.5ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	1	1	1	1	1
15.6ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	1	1	1	1	1
15.7 ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	1	1	1	1	1

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

การพัฒนาครูโดยการถ่ายทอด: รูปแบบการขยายผล					
16. โรงเรียนมีการใช้รูปแบบการขยายผลในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านคุณภาพทางปัญญาดังต่อไปนี้					
16.1 ทักษะการคิดขั้นสูง	1	1	1	1	1
16.2 ความรู้เชิงลึก	1	1	1	1	1
16.3 ความเข้าใจเชิงลึก	1	1	1	1	1
16.4 การสนทนาอย่างมีสาระสำคัญ	1	1	1	1	1
16.5 ความรู้ที่เป็นปัญหา	1	1	1	0	0.75
16.6 การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์ย่างลึกซึ้ง	1	1	1	0	0.75
17. โรงเรียนมีการใช้รูปแบบการขยายผลในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านความเชื่อมโยงดังต่อไปนี้					
17.1 การบูรณาการความรู้	1	1	1	1	1
17.2 ความรู้พื้นฐาน	1	1	1	1	1
17.3 ความเชื่อมโยงกับภายนอก	1	1	1	0	0.75
17.4 หลักสูตรโดยใช้ปัญหาเป็นฐาน	1	1	1	1	1
18. โรงเรียนมีการใช้รูปแบบการขยายผลในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านสภาพแวดล้อมห้องเรียนที่สนับสนุนดังต่อไปนี้					
18.1 การสอนถูกควบคุมหรือกำหนดโดยนักเรียน	1	1	1	0	0.75 นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้
18.2 การสนับสนุนทางสภาพแวดล้อมและสังคม	1	1	1	1	1
18.3 การมีส่วนร่วม	1	1	1	0	0 ระบุให้ชัดเจนว่าอะไร
18.4 เกณฑ์การประเมินผลที่ชัดเจน	1	1	1	1	1
18.5 การกำกับตนเอง	1	1	1	1	1
19. โรงเรียนมีการใช้รูปแบบการขยายผลในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านการยอมรับความแตกต่างดังต่อไปนี้					
19.1 ความรู้เกี่ยวกับวัฒนธรรม	1	1	1	1	1
19.2 การเข้าถึงนักเรียนอย่างทั่วถึง	1	1	1	1	1
19.3 การบรรยายตามลำดับเหตุการณ์	1	1	1	1	1

จุฬาลงกรณ์มหาวิทยาลัย

19.4 เอกลักษณ์กลุ่ม	1	1	1	1	1
19.5 ความเป็นพลเมือง	1	1	1	1	1
20. โรงเรียนมีการใช้รูปแบบการขยายผลในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหาดังต่อไปนี้					
20.1 ด้านความรู้ในเนื้อหา	1	1	1	1	1
20.2 ด้านความรู้ในด้านศาสตร์การสอน	1	1	1	1	1
20.3 ด้านความรู้ในด้านเทคโนโลยี	1	1	1	1	1
20.4 ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	1	1	1	1	1
20.5 ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	1	1	1	1	1
20.6 ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	1	1	1	1	1
20.7 ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	1	1	1	1	1

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

การพัฒนาครูโดยการส่งผ่าน: รูปแบบการพัฒนามาตรฐานวิชาชีพ 21. โรงเรียนมีการใช้รูปแบบการพัฒนามาตรฐานวิชาชีพในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านคุณภาพทางปัญญาดังต่อไปนี้					
21.1 ทักษะการคิดขั้นสูง	1	1	1	1	1
21.2 ความรู้เชิงลึก	1	1	1	1	1
21.3 ความเข้าใจเชิงลึก	1	1	1	1	1
21.4 การสนทนาอย่างมีสาระสำคัญ	1	1	1	1	1
21.5 ความรู้ที่เป็นปัญหา	1	1	1	0	0.75
21.6 การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์อย่างลึกซึ้ง	1	1	1	0	0.75
22. โรงเรียนมีการใช้รูปแบบการพัฒนามาตรฐานวิชาชีพในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านความเชื่อมโยงดังต่อไปนี้					
22.1 การบูรณาการความรู้	1	1	1	1	1
22.2 ความรู้พื้นฐาน	1	1	1	1	1
22.3 ความเชื่อมโยงกับภายนอก	1	1	1	0	0.75
22.4 หลักสูตรโดยใช้ปัญหาเป็นฐาน	1	1	1	1	1
23. โรงเรียนมีการใช้รูปแบบการพัฒนามาตรฐานวิชาชีพในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านสภาพแวดล้อมห้องเรียนที่สนับสนุนดังต่อไปนี้					
23.1 การสอนถูกควบคุมหรือกำหนดโดยนักเรียน	1	1	1	0	0.75 นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้
23.2 การสนับสนุนทางสภาพแวดล้อมและสังคม	1	1	1	1	1
23.3 การมีส่วนร่วม	1	1	1	0	0.75 ระบุให้ชัดเจนว่าอะไร
23.4 เกณฑ์การประเมินผลที่ชัดเจน	1	1	1	1	1
23.5 การกำกับตนเอง	1	1	1	1	1
24. โรงเรียนมีการใช้รูปแบบการพัฒนามาตรฐานวิชาชีพในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านการยอมรับความแตกต่างดังต่อไปนี้					

24.1 ความรู้เกี่ยวกับวัฒนธรรม	1	1	1	1	1
24.2 การเข้าถึงนักเรียนอย่างทั่วถึง	1	1	1	1	1
24.3 การบรรยายตามลำดับเหตุการณ์	1	1	1	1	1
24.4 เอกลักษณ์กลุ่ม	1	1	1	1	1
24.5 ความเป็นพลเมือง	1	1	1	1	1
25. โรงเรียนมีการใช้รูปแบบการพัฒนามาตรฐานวิชาชีพในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหาดังต่อไปนี้					
25.1 ด้านความรู้ในเนื้อหา	1	1	1	1	1
25.2 ด้านความรู้ในด้านศาสตร์การสอน	1	1	1	1	1
25.3 ด้านความรู้ในด้านเทคโนโลยี	1	1	1	1	1
25.4 ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	1	1	1	1	1
25.5 ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	1	1	1	1	1
25.6 ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	1	1	1	1	1
25.7 ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	1	1	1	1	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	ความคิดเห็นของผู้ทรง				
	1B	2V	3M	4K	ข้อเสนอแนะ
การพัฒนาครูโดยการส่งผ่าน: รูปแบบการโค้ชและพี่เลี้ยง 26. โรงเรียนมีการใช้รูปแบบการโค้ชและพี่เลี้ยงในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านคุณภาพทางปัญญาดังต่อไปนี้					
26.1 ทักษะการคิดขั้นสูง	1	1	1	1	1
26.2 ความรู้เชิงลึก	1	1	1	1	1
26.3 ความเข้าใจเชิงลึก	1	1	1	1	1
26.4 การสนทนาอย่างมีสาระสำคัญ	1	1	1	1	1
26.5 ความรู้ที่เป็นปัญหา	1	1	1	0	0.75
26.6 การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์อย่างลึกซึ้ง	1	1	1	0	0.75
27. โรงเรียนมีการใช้รูปแบบการโค้ชและพี่เลี้ยงในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านความเชื่อมโยงดังต่อไปนี้					
27.1 การบูรณาการความรู้	1	1	1	1	1
27.2 ความรู้พื้นฐาน	1	1	1	1	1
27.3 ความเชื่อมโยงกับภายนอก	1	1	1	0	0.75
27.4 หลักสูตรโดยใช้ปัญหาเป็นฐาน	1	1	1	1	1
28. โรงเรียนมีการใช้รูปแบบการโค้ชและพี่เลี้ยงในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านสภาพแวดล้อมห้องเรียนที่สนับสนุนดังต่อไปนี้					
28.1 การสอนถูกควบคุมหรือกำหนดโดยนักเรียน	1	1	1	0	0.75 นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้
28.2 การสนับสนุนทางสภาพแวดล้อมและสังคม	1	1	1	1	1
28.3 การมีส่วนร่วม	1	1	1	0	0.75 ระบุให้ชัดเจนว่าอะไร
28.4 เกณฑ์การประเมินผลที่ชัดเจน	1	1	1	1	1
28.5 การกำกับตนเอง	1	1	1	1	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	ความคิดเห็นของผู้ทรง				
	1B	2V	3M	4K	ข้อเสนอแนะ
29. โรงเรียนมีการใช้รูปแบบการโค้ชและพี่เลี้ยงในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านการยอมรับความแตกต่างดังต่อไปนี้					
29.1 ความรู้เกี่ยวกับวัฒนธรรม	1	1	1	1	1
29.2 การเข้าถึงนักเรียนอย่างทั่วถึง	1	1	1	1	1
29.3 การบรรยายตามลำดับเหตุการณ์	1	1	1	1	1
29.4 เอกลักษณ์กลุ่ม	1	1	1	1	1
29.5 ความเป็นพลเมือง	1	1	1	1	1
30. โรงเรียนมีการใช้รูปแบบการโค้ชและพี่เลี้ยงในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหาดังต่อไปนี้					
30.1 ด้านความรู้ในเนื้อหา	1	1	1	1	1
30.2 ด้านความรู้ในด้านศาสตร์การสอน	1	1	1	1	1
30.3 ด้านความรู้ในด้านเทคโนโลยี	1	1	1	1	1
30.4 ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	1	1	1	1	1
30.5 ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	1	1	1	1	1
30.6 ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	1	1	1	1	1
30.7 ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	1	1	1	1	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	ความคิดเห็นของผู้ทรง				
	1B	2V	3M	4K	ข้อเสนอแนะ
การพัฒนาครูโดยการส่งผ่าน: รูปแบบชุมชนนักปฏิบัติ 31. โรงเรียนมีการใช้รูปแบบชุมชนนักปฏิบัติในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านคุณภาพทางปัญญาดังต่อไปนี้					
31.1 ทักษะการคิดขั้นสูง	1	1	1	1	1
31.2 ความรู้เชิงลึก	1	1	1	1	1
31.3 ความเข้าใจเชิงลึก	1	1	1	1	1
31.4 การสนทนาอย่างมีสาระสำคัญ	1	1	1	1	1
31.5 ความรู้ที่เป็นปัญหา	1	1	1	0	0.75
31.6 การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์อย่างลึกซึ้ง	1	1	1	0	0.75
32. โรงเรียนมีการใช้รูปแบบชุมชนนักปฏิบัติในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านความเชื่อมโยงดังต่อไปนี้					
32.1 การบูรณาการความรู้	1	1	1	1	1
32.2 ความรู้พื้นฐาน	1	1	1	1	1
32.3 ความเชื่อมโยงกับภายนอก	1	1	1	0	0.75
32.4 หลักสูตรโดยใช้ปัญหาเป็นฐาน	1	1	1	1	1
33. โรงเรียนมีการใช้รูปแบบชุมชนนักปฏิบัติในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านสภาพแวดล้อมห้องเรียนที่สนับสนุนดังต่อไปนี้					
33.1 การสอนถูกควบคุมหรือกำหนดโดยนักเรียน	1	1	1	0	0.75 นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้
33.2 การสนับสนุนทางสภาพแวดล้อมและสังคม	1	1	1	1	1
33.3 การมีส่วนร่วม	1	1	1	0	0.75 ระบุให้ชัดเจนว่าอะไร
33.4 เกณฑ์การประเมินผลที่ชัดเจน	1	1	1	1	1
33.5 การกำกับตนเอง	1	1	1	1	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	ความคิดเห็นของผู้ทรง				
	1B	2V	3M	4K	ข้อเสนอแนะ
34. โรงเรียนมีการใช้รูปแบบชุมชนนักปฏิบัติในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านการยอมรับความแตกต่างดังต่อไปนี้					
34.1. ความรู้เกี่ยวกับวัฒนธรรม	1	1	1	1	1
34.2. การเข้าถึงนักเรียนอย่างทั่วถึง	1	1	1	1	1
34.3. การบรรยายตามลำดับเหตุการณ์	1	1	1	1	1
34.4. เอกลักษณ์กลุ่ม	1	1	1	1	1
34.5. ความเป็นพลเมือง	1	1	1	1	1
35. โรงเรียนมีการใช้รูปแบบชุมชนนักปฏิบัติในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหาดังต่อไปนี้					
35.1 ด้านความรู้ในเนื้อหา	1	1	1	1	1
35.2 ด้านความรู้ในด้านศาสตร์การสอน	1	1	1	1	1
35.3 ด้านความรู้ในด้านเทคโนโลยี	1	1	1	1	1
35.4 ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	1	1	1	1	1
35.5 ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	1	1	1	1	1
35.6 ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	1	1	1	1	1
35.7 ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	1	1	1	1	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	ความคิดเห็นของผู้ทรง				
	1B	2V	3M	4K	ข้อเสนอแนะ
การพัฒนาครูโดยการเปลี่ยนแปลง: รูปแบบการวิจัยเชิงปฏิบัติการ 36. โรงเรียนมีการใช้รูปแบบการวิจัยเชิงปฏิบัติการในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านคุณภาพทางปัญญาดังต่อไปนี้					
36.1 ทักษะการคิดขั้นสูง	1	1	1	1	1
36.2 ความรู้เชิงลึก	1	1	1	1	1
36.3 ความเข้าใจเชิงลึก	1	1	1	1	1
36.4 การสนทนาอย่างมีสาระสำคัญ	1	1	1	1	1
36.5 ความรู้ที่เป็นปัญหา	1	1	1	0	0.75
36.6 การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์อย่างลึกซึ้ง	1	1	1	0	0.75
37. โรงเรียนมีการใช้รูปแบบการวิจัยเชิงปฏิบัติการในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านความเชื่อมโยงดังต่อไปนี้					
37.1 การบูรณาการความรู้	1	1	1	1	1
37.2 ความรู้พื้นฐาน	1	1	1	1	1
37.3 ความเชื่อมโยงกับภายนอก	1	1	1	0	0.75
37.4 หลักสูตรโดยใช้ปัญหาเป็นฐาน	1	1	1	1	1
38. โรงเรียนมีการใช้รูปแบบการวิจัยเชิงปฏิบัติการในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านสภาพแวดล้อมห้องเรียนที่สนับสนุนดังต่อไปนี้					
38.1 การสอนถูกควบคุมหรือกำหนดโดยนักเรียน	1	1	1	0	0.75 นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้
38.2 การสนับสนุนทางสภาพแวดล้อมและสังคม	1	1	1	1	1
38.3 การมีส่วนร่วม	1	1	1	0	0.75 ระบุให้ชัดเจนว่าอะไร
38.4 เกณฑ์การประเมินผลที่ชัดเจน	1	1	1	1	1
38.5 การกำกับตนเอง	1	1	1	1	1

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	ความคิดเห็นของผู้ทรง				
	1B	2V	3M	4K	ข้อเสนอแนะ
39. โรงเรียนมีการใช้รูปแบบการวิจัยเชิงปฏิบัติการในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านการยอมรับความแตกต่างดังต่อไปนี้					
39.1 ความรู้เกี่ยวกับวัฒนธรรม	1	1	1	1	1
39.2 การเข้าถึงนักเรียนอย่างทั่วถึง	1	1	1	1	1
39.3 การบรรยายตามลำดับเหตุการณ์	1	1	1	1	1
39.4 เอกลักษณ์กลุ่ม	1	1	1	1	1
39.5 ความเป็นพลเมือง	1	1	1	1	1
40. โรงเรียนมีการใช้รูปแบบการวิจัยเชิงปฏิบัติการในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหาดังต่อไปนี้					
40.1 ด้านความรู้ในเนื้อหา	1	1	1	1	1
40.2 ด้านความรู้ในด้านศาสตร์การสอน	1	1	1	1	1
40.3 ด้านความรู้ในด้านเทคโนโลยี	1	1	1	1	1
40.4 ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	1	1	1	1	1
40.5 ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	1	1	1	1	1
40.6 ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	1	1	1	1	1
40.7 ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	1	1	1	1	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	ความคิดเห็นของผู้ทรง				
	1B	2V	3M	4K	ข้อเสนอแนะ
การพัฒนาครูโดยการเปลี่ยนแปลง: รูปแบบการเปลี่ยนแปลง 41. โรงเรียนมีการใช้รูปแบบการเปลี่ยนแปลงในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านคุณภาพทางปัญญาดังต่อไปนี้					
41.1 ทักษะการคิดขั้นสูง	1	1	1	1	1
41.2 ความรู้เชิงลึก	1	1	1	1	1
41.3 ความเข้าใจเชิงลึก	1	1	1	1	1
41.4 การสนทนาอย่างมีสาระสำคัญ	1	1	1	1	1
41.5 ความรู้ที่เป็นปัญหา	1	1	1	0	0.75
41.6 การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์อย่างลึกซึ้ง	1	1	1	0	0.75
42. โรงเรียนมีการใช้รูปแบบการเปลี่ยนแปลงในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านความเชื่อมโยงดังต่อไปนี้					
42.1 การบูรณาการความรู้	1	1	1	1	1
42.2 ความรู้พื้นฐาน	1	1	1	1	1
42.3 ความเชื่อมโยงกับภายนอก	1	1	1	0	0.75
42.4 หลักสูตรโดยใช้ปัญหาเป็นฐาน	1	1	1	1	1
43. โรงเรียนมีการใช้รูปแบบการเปลี่ยนแปลงในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านสภาพแวดล้อมห้องเรียนที่สนับสนุนดังต่อไปนี้					
43.1 การสอนถูกควบคุมหรือกำหนดโดยนักเรียน	1	1	1	0	0.75 นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้
43.2 การสนับสนุนทางสภาพแวดล้อมและสังคม	1	1	1	1	1
43.3 การมีส่วนร่วม	1	1	1	0	0.75 ระบุให้ชัดเจนว่าอะไร
43.4 เกณฑ์การประเมินผลที่ชัดเจน	1	1	1	1	1
43.5 การกำกับตนเอง	1	1	1	1	1

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	1B	2V	3M	4K	ข้อเสนอแนะ
44. โรงเรียนมีการใช้รูปแบบการเปลี่ยนแปลงในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพในด้านการยอมรับความแตกต่างดังต่อไปนี้					
44.1. ความรู้เกี่ยวกับวัฒนธรรม	1	1	1	1	1
44.2. การเข้าถึงนักเรียนอย่างทั่วถึง	1	1	1	1	1
44.3. การบรรยายตามลำดับเหตุการณ์	1	1	1	1	1
44.4. เอกลักษณ์กลุ่ม	1	1	1	1	1
44.5 ความเป็นพลเมือง	1	1	1	1	1
45. โรงเรียนมีการใช้รูปแบบการเปลี่ยนแปลงในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหาดังต่อไปนี้					
45.1 ด้านความรู้ในเนื้อหา	1	1	1	1	1
45.2 ด้านความรู้ในด้านศาสตร์การสอน	1	1	1	1	1
45.3 ด้านความรู้ในด้านเทคโนโลยี	1	1	1	1	1
45.4 ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	1	1	1	1	1
45.5 ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	1	1	1	1	1
45.6 ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	1	1	1	1	1
45.7 ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	1	1	1	1	1

ขอขอบพระคุณในความอนุเคราะห์ของท่านเป็นอย่างสูงมา ณ โอกาสนี้

APPENDIX B

DATA ANALYSIS

1) Research Questionnaire
2) The Results of the Research Questionnaire
3) ACCT Teacher Development Model
4) ACCT Teacher Development Model Evaluation Form

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Research Questionnaire

Current State and Desirable State of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies Questionnaire

This questionnaire is part of "Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies" Dissertation.

Indications

1. This research is part of Doctoral of Education in Educational Administration, Department of Educational Policy, Management and Leadership, Faculty of Education, Chulalongkorn University. The objective of this research is to develop " Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies".

2. There are 2 sets of questionnaire; one is for School Administrator and one is for out-of-field teacher.

3. The researcher aims to study current state and desirable state of Private School Teacher Development Based on the Concepts of TPACK and Productive Pedagogies. Please answer all the questions in each part as accurately as possible for the benefits of the studies in educational field. Your answers will only be using for the purpose of the research and the informants will not be disclose.

4. The questionnaire will be divided into 3 parts as follows:

Part 1 School's background information (For Administrator): The researcher will use checklist and questionnaire questions to inquire about the information such as school's name, Educational stages offered, total number of teacher, number of out-of-field teacher; subjects teaching and teaching levels.

Part 2 Personal Information (For educational Administrator and out-of-field teachers): The research will use checklist and questionnaire questions to inquire about informant's gender, age, Educational background, work position, work experience, and teaching levels.

Part 3 Current state and desirable state information on private school teacher development based on the concepts of TPACK and productive pedagogies (For educational Administrator and out-of-field teachers): The researcher will use rating scale (Rating scale of 5) to inquire about the information.

Thank you very much for contributing your time and effort in answering this questionnaire questions and please send the questionnaire back to the address in the envelop given by 30th January 2017.

Natthawut Katechaiyo
Student of Doctor of Education in Educational Administration,
Department of Educational Policy, Management and Leadership,
Faculty of Education, Chulalongkorn University
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Part 1 School's Background Information

Instruction: Please answer all the questions about your school in each part as accurately as possible.

1. School Name_____
2. Educational Stages Offered_____
3. Number of teachers in your school_____ Teachers
4. Out-of-field teachers (Non educational field) _____Teachers
5. Out-of-field teachers (Educational Field but assigned to teach other subjects)_____Teachers
6. Please specify the subjects and teaching levels that have the most out-of-field teachers to the least.
   - 6.1. Subject_____Levels_____
   - 6.2. Subject_____Levels_____
   - 6.3. Subject_____Levels_____
   - 6.4. Subject_____Levels_____
   - 6.5. Subject_____Levels_____
7. School size
   - ☐ Small (1-499 students) ☐ Medium (500-1,499 students)
   - ☐ 36- Large (1,500-2,499 Students) ☐ Extra Large (2,500 students and above)
8. Geographical Locations
   - ☐ Central ☐ North
   - ☐ 36- Northeast ☐ South

Part 2 Personal Information

Instruction: Please answers and ticks in the boxes based on your personal information

1. Gender
   - ☐ Male ☐ Female
2. Age (more than 6 months will be count as 1 year)
   - ☐ Less than 25 years old ☐ 26-30 years old ☐ 31-35 years old
   - ☐ 36-40 years old ☐ 41-45 years old ☐ 46 years old or above
3. Highest Education
   - ☐ Bachelor's degree of_____Major_____
   - ☐ Master's degree of_____Major_____
   - ☐ Doctoral's degree of_____Major_____
   - ☐ Others (please specify) _____
4. Current Work Position
   - ☐ School Director ☐ School Principal ☐ School Manager
   - ☐ Vice Principal ☐ Head of Department
   - ☐ Teacher: Please specify teaching subjects _____levels_____
5. Work Experience (more than 6 months will be count as 1 year)
   - ☐ Less than 6 Months ☐ 6 months–1 year ☐ 1-2 years
   - ☐ 2-5 years ☐ 5-10 years ☐ More than 10 years

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Part 3 Current state and desirable state information on private school teacher development based on the concepts of TPACK and productive pedagogies

Instruction: This questionnaire is in a rating scale format (Rating scale of 5); please ✓ in the boxes based on your judgement on the current states and desirable states on private school teacher development based on the concepts of TPACK and productive pedagogies

The rating scale numbers entailed the following description:

5 means Highest
4 means High
3 means moderate
2 means low
1 means very low

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Current states					Desirable states				
	5	4	3	2	1	5	4	3	2	1
Teacher Development by Transmission: Training Model 1. The school uses the training model in developing teachers on productive pedagogies in intellectual quality aspect as follows:										
1.1 Higher order thinking										
1.3 Deep knowledge										
1.4 Deep understanding										
1.5 Substantive conversation										
1.6 Knowledge problematic										
1.7 Metalanguage										
2. The school uses the training model in developing teachers on productive pedagogies in connectedness aspect as follows:										
2.1 Knowledge integration										
2.2 Background knowledge										
2.3 Connectedness to the world										
2.4 Problem based curriculum										
3. The school uses the training model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:										
3.1 Student control										
3.2 Social support										
3.3 Engagement										
3.4 Explicit criteria										
3.5 Self-regulation										
4. The school uses the training model in developing teachers on productive pedagogies in recognition of difference aspect as follows:										
4.1 Cultural knowledge										
4.2 Inclusivity										
4.3 Narrative										
4.4 Group identity										
4.5 Citizenship										

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The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Current states					Desirable states				
	5	4	3	2	1	5	4	3	2	1
5. The school uses the training model in developing teachers on technological pedagogical content knowledge as follows:										
5.1 Content knowledge										
5.2 Pedagogical knowledge										
5.3 Technological knowledge										
5.4 Pedagogical content knowledge										
5.5 Technological content knowledge										
5.6 Technological pedagogical knowledge										
5.7 Technological pedagogical content knowledge										
Teacher Development by Transmission: Award-Bearing Model 6. The school uses the award-bearing model in developing teachers on productive pedagogies in intellectual quality aspect as follows:										
6.1 Higher order thinking										
6.2 Deep knowledge										
6.3 Deep understanding										
6.4 Substantive conversation										
6.5 Knowledge problematic										
6.6 Metalanguage										
7. The school uses the award-bearing model in developing teachers on productive pedagogies in connectedness aspect as follows:										
7.1 Knowledge integration										
7.2 Background knowledge										
7.3 Connectedness to the world										
7.4 Problem based curriculum										
8. The school uses the award-bearing model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:										
8.1 Student control										
8.2 Social support										
8.3 Engagement										
8.4 Explicit criteria										
8.5 Self-regulation										
9. The school uses the award-bearing model in developing teachers on productive pedagogies in recognition of difference aspect as follows:										
9.1 Cultural knowledge										
9.2 Inclusivity										
9.3 Narrative										
9.4 Group identity										
9.5 Citizenship										

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The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Current states					Desirable states				
	5	4	3	2	1	5	4	3	2	1
10. The school uses the award-bearing model in developing teachers on technological pedagogical content knowledge as follows:										
10.1 Content knowledge										
10.2 Pedagogical knowledge										
10.3 Technological knowledge										
10.4 Pedagogical content knowledge										
10.5 Technological content knowledge										
10.6 Technological pedagogical knowledge										
10.7 Technological pedagogical content knowledge										
Teacher Development by Transmission: Deficit Model 11. The school uses the deficit model in developing teachers on productive pedagogies in intellectual quality aspect as follows:										
11.1 Higher order thinking										
11.2 Deep knowledge										
11.3 Deep understanding										
11.4 Substantive conversation										
11.5 Knowledge problematic										
11.6 Metalanguage										
12. The school uses the deficit model in developing teachers on productive pedagogies in connectedness aspect as follows:										
12.1 Knowledge integration										
12.2 Background knowledge										
12.3 Connectedness to the world										
12.4 Problem based curriculum										
13. The school uses the deficit model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:										
13.1 Student control										
13.2 Social support										
13.3 Engagement										
13.4 Explicit criteria										
13.5 Self-regulation										
14. The school uses the deficit model in developing teachers on productive pedagogies in recognition of difference aspect as follows:										
14.1 Cultural knowledge										
14.2 Inclusivity										
14.3 Narrative										
14.4 Group identity										
14.5 Citizenship										

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Current states					Desirable states				
	5	4	3	2	1	5	4	3	2	1
15. The school uses the deficit model in developing teachers on technological pedagogical content knowledge as follows:										
15.1 Content knowledge										
15.2 Pedagogical knowledge										
15.3 Technological knowledge										
15.4 Pedagogical content knowledge										
15.5 Technological content knowledge										
15.6 Technological pedagogical knowledge										
15.7 Technological pedagogical content knowledge										
Teacher Development by Transmission: Cascade Model 16. The school uses the cascade model in developing teachers on productive pedagogies in intellectual quality aspect as follows:										
16.1 Higher order thinking										
16.2 Deep knowledge										
16.3 Deep understanding										
16.4 Substantive conversation										
16.5 Knowledge problematic										
16.6 Metalanguage										
17. The school uses the cascade model in developing teachers on productive pedagogies in connectedness aspect as follows:										
17.1 Knowledge integration										
17.2 Background knowledge										
17.3 Connectedness to the world										
17.4 Problem based curriculum										
18. The school uses the cascade model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:										
18.1 Student control										
18.2 Social support										
18.3 Engagement										
18.4 Explicit criteria										
18.5 Self-regulation										
19. The school uses the cascade model in developing teachers on productive pedagogies in recognition of difference aspect as follows:										
19.1 Cultural knowledge										
19.2 Inclusivity										
19.3 Narrative										
19.4 Group identity										
19.5 Citizenship										

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Current states					Desirable states				
	5	4	3	2	1	5	4	3	2	1
20. The school uses the cascade model in developing teachers on technological pedagogical content knowledge as follows:										
20.1 Content knowledge										
20.2 Pedagogical knowledge										
20.3 Technological knowledge										
20.4 Pedagogical content knowledge										
20.5 Technological content knowledge										
20.6 Technological pedagogical knowledge										
20.7 Technological pedagogical content knowledge										
Teacher Development by Transitional: Standard-Based Model 21. The school uses the standard-based model in developing teachers on productive pedagogies in intellectual quality aspect as follows:										
21.1 Higher order thinking										
21.2 Deep knowledge										
21.3 Deep understanding										
21.4 Substantive conversation										
21.5 Knowledge problematic										
21.6 Metalanguage										
22. The school uses the standard-based model in developing teachers on productive pedagogies in connectedness aspect as follows:										
22.1 Knowledge integration										
22.2 Background knowledge										
22.3 Connectedness to the world										
22.4 Problem based curriculum										
23. The school uses the standard-based model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:										
23.1 Student control										
23.2 Social support										
23.3 Engagement										
23.4 Explicit criteria										
23.5 Self-regulation										
24. The school uses the standard-based model in developing teachers on productive pedagogies in recognition of difference aspect as follows:										
24.1 Cultural knowledge										
24.2 Inclusivity										
24.3 Narrative										
24.4 Group identity										
24.5 Citizenship										

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Current states					Desirable states				
	5	4	3	2	1	5	4	3	2	1
25. The school uses the standard-based model in developing teachers on technological pedagogical content knowledge as follows:										
25.1 Content knowledge										
25.2 Pedagogical knowledge										
25.3 Technological knowledge										
25.4 Pedagogical content knowledge										
25.5 Technological content knowledge										
25.6 Technological pedagogical knowledge										
25.7 Technological pedagogical content knowledge										
Teacher Development by Transitional: Coaching/Mentoring Model 26. The school uses the coaching/mentoring model in developing teachers on productive pedagogies in intellectual quality aspect as follows:										
26.1 Higher order thinking										
26.2 Deep knowledge										
26.3 Deep understanding										
26.4 Substantive conversation										
26.5 Knowledge problematic										
26.6 Metalanguage										
27. The school uses the coaching/mentoring model in developing teachers on productive pedagogies in connectedness aspect as follows:										
27.1 Knowledge integration										
27.2 Background knowledge										
27.3 Connectedness to the world										
27.4 Problem based curriculum										
28. The school uses the coaching/mentoring model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:										
28.1 Student control										
28.2 Social support										
28.3 Engagement										
28.4 Explicit criteria										
28.5 Self-regulation										
29. The school uses the coaching/mentoring model in developing teachers on productive pedagogies in recognition of difference aspect as follows:										
29.1 Cultural knowledge										
29.2 Inclusivity										
29.3 Narrative										
29.4 Group identity										
29.5 Citizenship										

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Current states					Desirable states				
	5	4	3	2	1	5	4	3	2	1
30. The school uses the coaching/mentoring model in developing teachers on technological pedagogical content knowledge as follows:										
30.1 Content knowledge										
30.2 Pedagogical knowledge										
30.3 Technological knowledge										
30.4 Pedagogical content knowledge										
30.5 Technological content knowledge										
30.6 Technological pedagogical knowledge										
30.7 Technological pedagogical content knowledge										
Teacher Development by Transitional: Community of Practice Model 31. The school uses the community of practice model in developing teachers on productive pedagogies in intellectual quality aspect as follows:										
31.1 Higher order thinking										
31.2 Deep knowledge										
31.3 Deep understanding										
31.4 Substantive conversation										
31.5 Knowledge problematic										
31.6 Metalanguage										
32. The school uses the community of practice model in developing teachers on productive pedagogies in connectedness aspect as follows:										
32.1 Knowledge integration										
32.2 Background knowledge										
32.3 Connectedness to the world										
32.4 Problem based curriculum										
33. The school uses the community of practice model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:										
33.1 Student control										
33.2 Social support										
33.3 Engagement										
33.4 Explicit criteria										
33.5.Self-regulation										
34. The school uses the community of practice model in developing teachers on productive pedagogies in recognition of difference aspect as follows:										
34.1 Cultural knowledge										
34.2 Inclusivity										
34.3 Narrative										
34.4 Group identity										
34.5 Citizenship										

35. The school uses the community of practice model in developing teachers on technological pedagogical content knowledge as follows:										
35.1 Content knowledge										
35.2 Pedagogical knowledge										
35.3 Technological knowledge										
35.4 Pedagogical content knowledge										
35.5 Technological content knowledge										
35.6 Technological pedagogical knowledge										
35.7 Technological pedagogical content knowledge										
Teacher Development by Transformative: Action Research Model 36. The school uses the action research model in developing teachers on productive pedagogies in intellectual quality aspect as follows:										
36.1 Higher order thinking										
36.2 Deep knowledge										
36.3 Deep understanding										
36.4 Substantive conversation										
36.5 Knowledge problematic										
36.6 Metalanguage										
37. The school uses the action research model in developing teachers on productive pedagogies in connectedness aspect as follows:										
37.1 Knowledge integration										
37.2 Background knowledge										
37.3 Connectedness to the world										
37.4 Problem based curriculum										
38. The school uses the action research model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:										
38.1 Student control										
38.2 Social support										
38.3 Engagement										
38.4 Explicit criteria										
38.5 Self-regulation										
39. The school uses the action research model in developing teachers on productive pedagogies in recognition of difference aspect as follows:										
39.1 Cultural knowledge										
39.2 Inclusivity										
39.3 Narrative										
39.4 Group identity										
39.5 Citizenship										

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The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Current states					Desirable states				
	5	4	3	2	1	5	4	3	2	1
40. The school uses the action research model in developing teachers on technological pedagogical content knowledge as follows:										
40.1 Content knowledge										
40.2 Pedagogical knowledge										
40.3 Technological knowledge										
40.4 Pedagogical content knowledge										
40.5 Technological content knowledge										
40.6 Technological pedagogical knowledge										
40.7 Technological pedagogical content knowledge										
Teacher Development by Transformative: Transformative Model 41. The school uses the transformative model in developing teachers on productive pedagogies in intellectual quality aspect as follows:										
41.1 Higher order thinking										
41.2 Deep knowledge										
41.3 Deep understanding										
41.4 Substantive conversation										
41.5 Knowledge problematic										
41.6 Metalanguage										
42. The school uses the transformative model in developing teachers on productive pedagogies in connectedness aspect as follows:										
42.1 Knowledge integration										
42.2 Background knowledge										
42.3 Connectedness to the world										
42.4 Problem based curriculum										
43. The school uses the transformative model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:										
43.1 Student control										
43.2 Social support										
43.3 Engagement										
43.4 Explicit criteria										
43.5 Self-regulation										
44. The school uses the transformative model in developing teachers on productive pedagogies in recognition of difference aspect as follows:										
44.1 Cultural knowledge										
44.2 Inclusivity										
44.3 Narrative										
44.4 Group identity										
44.5 Citizenship										

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Current states					Desirable states				
	5	4	3	2	1	5	4	3	2	1
45. The school uses the transformative model in developing teachers on technological pedagogical content knowledge as follows:										
45.1 Content knowledge										
45.2 Pedagogical knowledge										
45.3 Technological knowledge										
45.4 Pedagogical content knowledge										
45.5 Technological content knowledge										
45.6 Technological pedagogical knowledge										
45.7 Technological pedagogical content knowledge										

Thank you for your kind cooperation.

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แบบสอบถามสภาพปัจจุบันและสภาพอันพึงประสงค์ของการพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ

แบบสอบถามนี้เป็นส่วนนึงของงานวิจัย เรื่อง รูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ

<u>คำชี้แจง</u>

1. การวิจัยครั้งนี้เป็นส่วนหนึ่งของการศึกษาหลักสูตรครุศาสตร์ดุษฎีบัณฑิต สาขาวิชาบริหารการศึกษาภาควิชานโยบายการจัดการและความเป็นผู้นำทางการศึกษา คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัยโดยมีวัตถุประสงค์เพื่อพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ
2. แบบสอบถามมีทั้งหมด ฉบับ เป็นแบบสอบถามสำหรับ ผู้บริหารโรงเรียน จำนวน 1 ฉบับ 2ครูผู้สอนไม่ตรงวิชาเอกที่เรียนมาหรือไม่ได้จบครุศาสตร์จำนวน ฉบับ 1
3. ผู้วิจัยต้องการศึกษาความคิดเห็นเกี่ยวกับสภาพปัจจุบันและสภาพที่พึงประสงค์ของการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ ขอความกรุณาท่านโปรดช่วยตอบแบบสอบถามทุกขั้นตอน ทุกข้อ ตามสภาพจริง ให้ตรงกับความคิดเห็นของท่านให้มากที่สุดเพราะข้อมูลที่เป็นจริงของท่านจะมีคุณค่าอย่างยิ่งต่องานวิจัยและจะเป็นประโยชน์ต่อการพัฒนาคุณภาพการศึกษาของประเทศไทยในภาพรวมต่อไป การตอบแบบสอบถามครั้งนี้จะไม่มีผลกระทบต่อท่านและการปฏิบัติงานของท่านแต่ประการใด เพราะผู้วิจัยจะนำไปวิเคราะห์และนำเสนอผลในภาพรวมเท่านั้น
4. แบบสอบถามชุดนี้แบ่งออกเป็น 3 ตอน ประกอบด้วย

   ตอนที่ 1ข้อมูลพื้นฐานของโรงเรียน **<u>(เฉพาะผู้บริหาร)</u>** โดยใช้แบบตรวจสอบรายการ (Checklist) และแบบสอบถาม (Questionnaire) ในส่วนข้อมูลของโรงเรียนประกอบด้วย ระดับชั้นที่ทำการเปิดสอน จำนวนครูในสถานศึกษา จำนวนครูที่ไม่ได้จบครุศาสตร์หรือศึกษาศาสตร์ จำนวนครูที่สอนไม่ตรงวิชาเอกที่เรียนมา รายวิชาที่มีครูสอนไม่ตรงวิชาเอกจากมากที่สุดไปน้อยที่สุด

   ตอนที่ข้อมูลพื้นฐานของ 2 ผู้ตอบแบบสอบถาม **<u>(ผู้บริหารและครู)</u>**โดยใช้แบบตรวจสอบรายการ (Checklist) และแบบสอบถาม (Questionnaire(ในส่วนขอมูลของผู้ตอบแบบสอบถาม ประกอบด้วย เพศ อายุ วุฒิการศึกษาสูงสุด ตำแหน่งปัจจุบัน ระยะเวลาในการทำงานและระดับชั้นที่ทำการสอน

   ตอนที่ 3 ข้อมูลเกี่ยวกับสภาพปัจจุบันและสภาพที่พึงประสงค์ของการพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ **<u>(ผู้บริหารและครู)</u>** โดยใช้แบบสอบถามแบบมาตราส่วนประมาณค่า (Rating Scale) 5 ระดับ
5. ผู้วิจัยขอขอบพระคุณทุกท่านเป็นอย่างสูง ที่กรุณาให้ความอนุเคราะห์เสียสละเวลาของท่านให้ความร่วมมือ ในการตอบแบบสอบถามเพื่อการวิจัยครั้งนี้เป็นอย่างดียิ่ง และพร้อมทั้งกรุณาให้ความอนุเคราะห์ส่งกลับคืนผู้วิจัย โดยใส่ซองที่ผู้วิจัยได้ติดแสตมป์เรียบร้อยแล้ว ส่งคืนทางไปรษณีย์ถึงผู้วิจัย **<u>ภายในวันที่ พฤศจิกายน 2562 30</u>**

นายณัฐวุฒิ เกตุไชโย
นิสิตปริญญาดุษฎีบัณฑิต สาขาวิชาบริหารการศึกษา
ภาควิชานโยบายการจัดการและความเป็นผู้นำทางการศึกษา
คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
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จุฬาลงกรณ์มหาวิทยาลัย
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ตอนที่ 1 ข้อมูลพื้นฐานของโรงเรียน (ตอบเฉพาะผู้บริหาร)

<u>คำชี้แจง</u> โปรดกรอกข้อมูลโรงเรียนของท่านตามความเป็นจริง

1. **ระดับชั้นที่เปิดสอน**_____
2. **จำนวนครูในสถานศึกษาของท่านจำนวน**_____ **คน**
3. **จำนวนครูที่ไม่ได้จบครุศาสตร์หรือศึกษาศาสตร์ จำนวน**_____**คน**
4. **จำนวนครูที่สอนไม่ตรงวิชาเอกที่เรียนมา จำนวน**_____**คน**
5. **โปรดระบุรายวิชาที่มีครูสอนไม่ตรงวิชาเอกจากมากที่สุดไปน้อยที่สุด**
   - 5.1. ชื่อวิชา_____สอนระดับชั้น_____
   - 5.2. ชื่อวิชา_____สอนระดับชั้น_____
   - 5.3. ชื่อวิชา_____สอนระดับชั้น_____
   - 5.4. ชื่อวิชา_____สอนระดับชั้น_____
   - 5.5. ชื่อวิชา_____สอนระดับชั้น_____
6. **ขนาดของโรงเรียน**
   - ☐ ขนาดเล็ก (1-120 คน)
   - ☐ ขนาดกลาง (121-600 คน)
   - ☐ ขนาดใหญ่ (601-1,500 คน)
   - ☐ ขนาดใหญ่พิเศษ (1,500คนขึ้นไป)
7. **ภูมิภาค**
   - ☐ ภาคกลาง
   - ☐ ภาคเหนือ
   - ☐ ภาคตะวันออกเฉียงเหนือ
   - ☐ ภาคใต้

ตอนที่ ข้อมูลพื้นฐานของผู้ตอบแบบสอบถาม 2

<u>คำชี้แจง</u> โปรดเขียนเครื่องหมาย **√**ลงในช่อง ☐ ตามความเป็นจริง

1. **เพศ**
   - ☐ ชาย
   - ☐ หญิง
2. **อายุ** (เศษของอายุปีตั้งแต่ 6 เดือนขึ้นไปนับเป็น 1 ปี)
   - ☐ ไม่เกิน 25 ปี
   - ☐ 26-30 ปี
   - ☐ 31-35 ปี
   - ☐ 36-40 ปี
   - ☐ 41-45 ปี
   - ☐ 46 ปีขึ้นไป

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Chulalongkorn University

3. **วุฒิการศึกษาสูงสุด**
   - ☐ ปริญญาตรีสาขา_____วิชาเอก_____
   - ☐ ปริญญาโทสาขา_____วิชาเอก_____
   - ☐ ปริญญาเอกสาขา_____วิชาเอก_____
   - ☐ อื่นๆ_____
4. **ตำแหน่งปัจจุบัน**
   - ☐ ผู้รับใบอนุญาต
   - ☐ ผู้อำนวยการ
   - ☐ ผู้จัดการ
   - ☐ รองผู้อำนวยการ
   - ☐ หัวหน้าฝ่าย (โปรดระบุ)_____
   - ☐ ครูผู้สอนวิชา_____ระดับชั้น_____
   - ☐ อื่นๆ_____

5. ระยะเวลาในการทำงาน (เศษของปีตั้งแต่ 6 เดือนขึ้นไปนับเป็น 1 ปี)

☐ น้อยกว่า 6 เดือน ☐ 6 เดือน - 1 ปี ☐ 1–2 ปี

☐ 2-5ปี ☐ 5-10 ปี ☐ มากกว่า 10 ปีขึ้นไป

ตอนที่ ความคิดเห็นเกี่ยวกับสภาพปัจจุบันและสภาพที่พึงประสงค์ของ 3รูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ

คำชี้แจง แบบสอบถามนี้ เป็นแบบมาตราส่วนประมาณค่า (Rating Scale) **√** ระดับโปรดทำเครื่องหมาย 5 ลงในช่องของระดับคะแนน ซึ่งตรงกับระดับความคิดเห็นของท่านต่อสภาพปัจจุบันและสภาพที่พึงประสงค์ของการพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ โดยกำหนดเกณฑ์การให้คะแนน ดังนี้

5 หมายถึง มากที่สุด

4 หมายถึง มาก

3 หมายถึง ปานกลาง

2 หมายถึง น้อย

1 หมายถึง น้อยที่สุด

ตัวอย่างการตอบคำถาม

ตัวอย่าง	สภาพปัจจุบัน					สภาพที่พึงประสงค์				
	5	4	3	2	1	5	4	3	2	1
การพัฒนาครูโดยการถ่ายทอด: รูปแบบการฝึกอบรม										
1. โรงเรียนมีการใช้**รูปแบบการฝึกอบรม**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน**ด้านคุณภาพทางปัญญา**ดังต่อไปนี้										
(1) ทักษะการคิดขั้นสูง	√								√	
(2) ความรู้เชิงลึก			√							√
(3) ความเข้าใจเชิงลึก		√						√		
(4) การสนทนาอย่างมีสาระสำคัญ			√						√	
(5) ความรู้ที่เป็นปัญหา					√			√		
(6) การพินิจพิเคราะห์แง่มุมของภาษาวลีและคำศัพท์อย่างลึกซึ้ง					√	√				

ขอความกรุณาตอบคำถามทั้งสองฝั่งดังตัวอย่าง

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	สภาพปัจจุบัน					สภาพที่พึงประสงค์				
	5	4	3	2	1	5	4	3	2	1
การพัฒนาครูโดยการถ่ายทอด: รูปแบบการฝึกอบรม										
1. โรงเรียนมีการใช้**รูปแบบการฝึกอบรม**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านคุณภาพทางปัญญา**ดังต่อไปนี้										
(1) ทักษะการคิดขั้นสูง	5	4	3	2	1	5	4	3	2	1
(2) ความรู้เชิงลึก	5	4	3	2	1	5	4	3	2	1
(3) ความเข้าใจเชิงลึก	5	4	3	2	1	5	4	3	2	1
(4) การสนทนาอย่างมีสาระสำคัญ	5	4	3	2	1	5	4	3	2	1
(5) ความรู้ที่เป็นปัญหา	5	4	3	2	1	5	4	3	2	1
(6) การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์ย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
2. โรงเรียนมีการใช้**รูปแบบการฝึกอบรม**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านความเชื่อมโยง**ดังต่อไปนี้										
(1) การบูรณาการความรู้	5	4	3	2	1	5	4	3	2	1
(2) ความรู้พื้นฐาน	5	4	3	2	1	5	4	3	2	1
(3) ความเชื่อมโยงกับภายนอก	5	4	3	2	1	5	4	3	2	1
(4) หลักสูตรโดยใช้ปัญหาเป็นฐาน	5	4	3	2	1	5	4	3	2	1
3. โรงเรียนมีการใช้**รูปแบบการฝึกอบรม**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านสภาพแวดล้อมห้องเรียนที่เอื้อต่อการเรียนรู้**ดังต่อไปนี้										
(1) นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้	5	4	3	2	1	5	4	3	2	1
(2) การสนับสนุนทางสภาพแวดล้อมและสังคม	5	4	3	2	1	5	4	3	2	1
(3) การมีส่วนร่วมทางวิชาการอย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
(4) เกณฑ์การประเมินผลที่ชัดเจน	5	4	3	2	1	5	4	3	2	1
(5) การกำกับตนเอง	5	4	3	2	1	5	4	3	2	1
4. โรงเรียนมีการใช้**รูปแบบการฝึกอบรม**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านการยอมรับความแตกต่าง**ดังต่อไปนี้										
(1) ความรู้เกี่ยวกับวัฒนธรรม	5	4	3	2	1	5	4	3	2	1
(2) การเข้าถึงนักเรียนอย่างทั่วถึง	5	4	3	2	1	5	4	3	2	1
(3) การบรรยายตามลำดับเหตุการณ์	5	4	3	2	1	5	4	3	2	1
(4) เอกลักษณ์กลุ่ม	5	4	3	2	1	5	4	3	2	1
(5) ความเป็นพลเมือง	5	4	3	2	1	5	4	3	2	1

5. โรงเรียนมีการใช้**รูปแบบการฝึกอบรม**ในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการใน **ด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา**ดังต่อไปนี้										
(1) ด้านความรู้ในเนื้อหา	5	4	3	2	1	5	4	3	2	1
(2) ด้านความรู้ในด้านศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(3) ด้านความรู้ในด้านเทคโนโลยี	5	4	3	2	1	5	4	3	2	1
(4) ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(5) ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(6) ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(7) ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1

การพัฒนาครูโดยการถ่ายทอด: รูปแบบการเรียนเพิ่มวุฒิ										
6. โรงเรียนมีการใช้**รูปแบบการเรียนเพิ่มวุฒิ**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านคุณภาพทางปัญญา**ดังต่อไปนี้										
(1) ทักษะการคิดขั้นสูง	5	4	3	2	1	5	4	3	2	1
(2) ความรู้เชิงลึก	5	4	3	2	1	5	4	3	2	1
(3) ความเข้าใจเชิงลึก	5	4	3	2	1	5	4	3	2	1
(4) การสนทนาอย่างมีสาระสำคัญ	5	4	3	2	1	5	4	3	2	1
(5) ความรู้ที่เป็นปัญหา	5	4	3	2	1	5	4	3	2	1
(6) การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์อย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
7. โรงเรียนมีการใช้**รูปแบบการเรียนเพิ่มวุฒิ**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านความเชื่อมโยง**ดังต่อไปนี้										
(1) การบูรณาการความรู้	5	4	3	2	1	5	4	3	2	1
(2) ความรู้พื้นฐาน	5	4	3	2	1	5	4	3	2	1
(3) ความเชื่อมโยงกับภายนอก	5	4	3	2	1	5	4	3	2	1
(4) หลักสูตรโดยใช้ปัญหาเป็นฐาน	5	4	3	2	1	5	4	3	2	1
8. โรงเรียนมีการใช้**รูปแบบการเรียนเพิ่มวุฒิ**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านสภาพแวดล้อมห้องเรียนที่เอื้อต่อการเรียนรู้**ดังต่อไปนี้										
(1) นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้	5	4	3	2	1	5	4	3	2	1
(2) การสนับสนุนทางสภาพแวดล้อมและสังคม	5	4	3	2	1	5	4	3	2	1
(3) การมีส่วนร่วมทางวิชาการอย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
(4) เกณฑ์การประเมินผลที่ชัดเจน	5	4	3	2	1	5	4	3	2	1
(5) การกำกับตนเอง	5	4	3	2	1	5	4	3	2	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	สภาพปัจจุบัน					สภาพที่พึงประสงค์				
	5	4	3	2	1	5	4	3	2	1
9. โรงเรียนมีการพัฒนาครูโดยใช้**รูปแบบการเรียนเพิ่มวุฒิ**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน**ด้านการยอมรับความแตกต่าง**ดังต่อไปนี้										
(1) ความรู้เกี่ยวกับวัฒนธรรม	5	4	3	2	1	5	4	3	2	1
(2) การเข้าถึงนักเรียนอย่างทั่วถึง	5	4	3	2	1	5	4	3	2	1
(3) การบรรยายตามลำดับเหตุการณ์	5	4	3	2	1	5	4	3	2	1
(4) เอกลักษณ์กลุ่ม	5	4	3	2	1	5	4	3	2	1
(5) ความเป็นพลเมือง	5	4	3	2	1	5	4	3	2	1
10. โรงเรียนมีการใช้**รูปแบบการเรียนเพิ่มวุฒิ**ในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการใน**ด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา**ดังต่อไปนี้										
(1) ด้านความรู้ในเนื้อหา	5	4	3	2	1	5	4	3	2	1
(2) ด้านความรู้ในด้านศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(3) ด้านความรู้ในด้านเทคโนโลยี	5	4	3	2	1	5	4	3	2	1
(4) ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(5) ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(6) ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(7) ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	สภาพปัจจุบัน					สภาพที่พึงประสงค์				
	5	4	3	2	1	5	4	3	2	1
การพัฒนาครูโดยการถ่ายทอด: รูปแบบการเติมเต็มสิ่งที่ขาด										
11. โรงเรียนมีการใช้**รูปแบบการเติมเต็มสิ่งที่ขาด**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน**ด้านคุณภาพทางปัญญา**ดังต่อไปนี้										
(1) ทักษะการคิดขั้นสูง	5	4	3	2	1	5	4	3	2	1
(2) ความรู้เชิงลึก	5	4	3	2	1	5	4	3	2	1
(3) ความเข้าใจเชิงลึก	5	4	3	2	1	5	4	3	2	1
(4) การสนทนาอย่างมีสาระสำคัญ	5	4	3	2	1	5	4	3	2	1
(5) ความรู้ที่เป็นปัญหา	5	4	3	2	1	5	4	3	2	1
(6) การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์อย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
12. โรงเรียนมีการใช้**รูปแบบการเติมเต็มสิ่งที่ขาด**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน**ด้านความเชื่อมโยง**ดังต่อไปนี้										
(1) การบูรณาการความรู้	5	4	3	2	1	5	4	3	2	1
(2) ความรู้พื้นฐาน	5	4	3	2	1	5	4	3	2	1
(3) ความเชื่อมโยงกับภายนอก	5	4	3	2	1	5	4	3	2	1
(4) หลักสูตรโดยใช้ปัญหาเป็นฐาน	5	4	3	2	1	5	4	3	2	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	สภาพปัจจุบัน					สภาพที่พึงประสงค์				
	5	4	3	2	1	5	4	3	2	1
13. โรงเรียนมีการใช้**รูปแบบการเติมเต็มสิ่งที่ขาด**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านสภาพแวดล้อมห้องเรียนที่เอื้อต่อการเรียนรู้**ดังต่อไปนี้										
(1) นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้	5	4	3	2	1	5	4	3	2	1
(2) การสนับสนุนทางสภาพแวดล้อมและสังคม	5	4	3	2	1	5	4	3	2	1
(3) การมีส่วนร่วมทางวิชาการอย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
(4) เกณฑ์การประเมินผลที่ชัดเจน	5	4	3	2	1	5	4	3	2	1
(5) การกำกับตนเอง	5	4	3	2	1	5	4	3	2	1
14. โรงเรียนมีการใช้**รูปแบบการเติมเต็มสิ่งที่ขาด**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านการยอมรับความแตกต่าง**ดังต่อไปนี้										
(1) ความรู้เกี่ยวกับวัฒนธรรม	5	4	3	2	1	5	4	3	2	1
(2) การเข้าถึงนักเรียนอย่างทั่วถึง	5	4	3	2	1	5	4	3	2	1
(3) การบรรยายตามลำดับเหตุการณ์	5	4	3	2	1	5	4	3	2	1
(4) เอกลักษณ์กลุ่ม	5	4	3	2	1	5	4	3	2	1
(5) ความเป็นพลเมือง	5	4	3	2	1	5	4	3	2	1
15. โรงเรียนมีการใช้**รูปแบบการเรียนเติมเต็มสิ่งที่ขาด**ในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการใน **ด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา**ดังต่อไปนี้										
(1) ด้านความรู้ในเนื้อหา	5	4	3	2	1	5	4	3	2	1
(2) ด้านความรู้ในด้านศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(3) ด้านความรู้ในด้านเทคโนโลยี	5	4	3	2	1	5	4	3	2	1
(4) ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(5) ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(6) ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(7) ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	สภาพปัจจุบัน					สภาพที่พึงประสงค์				
	5	4	3	2	1	5	4	3	2	1
การพัฒนาครูโดยการถ่ายทอด: รูปแบบการขยายผล										
16. โรงเรียนมีการใช้**รูปแบบการขยายผล**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านคุณภาพทางปัญญา**ดังต่อไปนี้										
(1) ทักษะการคิดขั้นสูง	5	4	3	2	1	5	4	3	2	1
(2) ความรู้เชิงลึก	5	4	3	2	1	5	4	3	2	1
(3) ความเข้าใจเชิงลึก	5	4	3	2	1	5	4	3	2	1
(4) การสนทนาอย่างมีสาระสำคัญ	5	4	3	2	1	5	4	3	2	1
(5) ความรู้ที่เป็นปัญหา	5	4	3	2	1	5	4	3	2	1

(6) การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์อย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
17. โรงเรียนมีการใช้**รูปแบบการขยายผล**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านความเชื่อมโยง**ดังต่อไปนี้										
(1) การบูรณาการความรู้	5	4	3	2	1	5	4	3	2	1
(2) ความรู้พื้นฐาน	5	4	3	2	1	5	4	3	2	1
(3) ความเชื่อมโยงกับภายนอก	5	4	3	2	1	5	4	3	2	1
(4) หลักสูตรโดยใช้ปัญหาเป็นฐาน	5	4	3	2	1	5	4	3	2	1
18. โรงเรียนมีการใช้**รูปแบบการขยายผล**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านสภาพแวดล้อมห้องเรียนที่เอื้อต่อการเรียนรู้**ดังต่อไปนี้										
(1) นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้	5	4	3	2	1	5	4	3	2	1
(2) การสนับสนุนทางสภาพแวดล้อมและสังคม	5	4	3	2	1	5	4	3	2	1
(3) การมีส่วนร่วมทางวิชาการอย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
(4) เกณฑ์การประเมินผลที่ชัดเจน	5	4	3	2	1	5	4	3	2	1
(5) การกำกับตนเอง	5	4	3	2	1	5	4	3	2	1
19. โรงเรียนมีการใช้**รูปแบบการขยายผล**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านการยอมรับความแตกต่าง**ดังต่อไปนี้										
(1) ความรู้เกี่ยวกับวัฒนธรรม	5	4	3	2	1	5	4	3	2	1
(2) การเข้าถึงนักเรียนอย่างทั่วถึง	5	4	3	2	1	5	4	3	2	1
(3) การบรรยายตามลำดับเหตุการณ์	5	4	3	2	1	5	4	3	2	1
(4) เอกลักษณ์กลุ่ม	5	4	3	2	1	5	4	3	2	1
(5) ความเป็นพลเมือง	5	4	3	2	1	5	4	3	2	1
20. โรงเรียนมีการใช้**รูปแบบการขยายผล**ในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการใน **ด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา**ดังต่อไปนี้										
(1) ด้านความรู้ในเนื้อหา	5	4	3	2	1	5	4	3	2	1
(2) ด้านความรู้ในด้านศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(3) ด้านความรู้ในด้านเทคโนโลยี	5	4	3	2	1	5	4	3	2	1
(4) ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(5) ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(6) ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(7) ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	สภาพปัจจุบัน					สภาพที่พึงประสงค์				
	5	4	3	2	1	5	4	3	2	1
การพัฒนาครูโดยการส่งผ่าน: รูปแบบการพัฒนามาตราฐานวิชาชีพ										
21. โรงเรียนมีการใช้**รูปแบบการพัฒนามาตราฐานวิชาชีพ**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน**ด้านคุณภาพทางปัญญา**ดังต่อไปนี้										
(1) ทักษะการคิดขั้นสูง	5	4	3	2	1	5	4	3	2	1
(2) ความรู้เชิงลึก	5	4	3	2	1	5	4	3	2	1
(3) ความเข้าใจเชิงลึก	5	4	3	2	1	5	4	3	2	1
(4) การสนทนาอย่างมีสาระสำคัญ	5	4	3	2	1	5	4	3	2	1
(5) ความรู้ที่เป็นปัญหา	5	4	3	2	1	5	4	3	2	1
(6) การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์อย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
22. โรงเรียนมีการใช้**รูปแบบการพัฒนามาตราฐานวิชาชีพ**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน**ด้านความเชื่อมโยง**ดังต่อไปนี้										
(1) การบูรณาการความรู้	5	4	3	2	1	5	4	3	2	1
(2) ความรู้พื้นฐาน	5	4	3	2	1	5	4	3	2	1
(3) ความเชื่อมโยงกับภายนอก	5	4	3	2	1	5	4	3	2	1
(4) หลักสูตรโดยใช้ปัญหาเป็นฐาน	5	4	3	2	1	5	4	3	2	1
23. โรงเรียนมีการใช้**รูปแบบการพัฒนามาตราฐานวิชาชีพ**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน**ด้านสภาพแวดล้อมห้องเรียนที่เอื้อต่อการเรียนรู้**ดังต่อไปนี้										
(1) นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้	5	4	3	2	1	5	4	3	2	1
(2) การสนับสนุนทางสภาพแวดล้อมและสังคม	5	4	3	2	1	5	4	3	2	1
(3) การมีส่วนร่วมทางวิชาการอย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
(4) เกณฑ์การประเมินผลที่ชัดเจน	5	4	3	2	1	5	4	3	2	1
(5) การกำกับตนเอง	5	4	3	2	1	5	4	3	2	1
24. โรงเรียนมีการใช้**รูปแบบการพัฒนามาตราฐานวิชาชีพ**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน**ด้านการยอมรับความแตกต่าง**ดังต่อไปนี้										
(1) ความรู้เกี่ยวกับวัฒนธรรม	5	4	3	2	1	5	4	3	2	1
(2) การเข้าถึงนักเรียนอย่างทั่วถึง	5	4	3	2	1	5	4	3	2	1
(3) การบรรยายตามลำดับเหตุการณ์	5	4	3	2	1	5	4	3	2	1
(4) เอกลักษณ์กลุ่ม	5	4	3	2	1	5	4	3	2	1
(5) ความเป็นพลเมือง	5	4	3	2	1	5	4	3	2	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	สภาพปัจจุบัน					สภาพที่พึงประสงค์				
	5	4	3	2	1	5	4	3	2	1
25. โรงเรียนมีการใช้**รูปแบบการพัฒนามาตราฐานวิชาชีพ**ในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการใน**ด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา**ดังต่อไปนี้										
(1) ด้านความรู้ในเนื้อหา	5	4	3	2	1	5	4	3	2	1
(2) ด้านความรู้ในด้านศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(3) ด้านความรู้ในด้านเทคโนโลยี	5	4	3	2	1	5	4	3	2	1
(4) ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(5) ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(6) ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(7) ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	สภาพปัจจุบัน					สภาพที่พึงประสงค์				
	5	4	3	2	1	5	4	3	2	1
การพัฒนาครูโดยการส่งผ่าน: รูปแบบการโค้ชและพี่เลี้ยง										
26. โรงเรียนมีการใช้**รูปแบบการโค้ชและพี่เลี้ยง**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน**ด้านคุณภาพทางปัญญา**ดังต่อไปนี้										
(1) ทักษะการคิดขั้นสูง	5	4	3	2	1	5	4	3	2	1
(2) ความรู้เชิงลึก	5	4	3	2	1	5	4	3	2	1
(3) ความเข้าใจเชิงลึก	5	4	3	2	1	5	4	3	2	1
(4) การสนทนาอย่างมีสาระสำคัญ	5	4	3	2	1	5	4	3	2	1
(5) ความรู้ที่เป็นปัญหา	5	4	3	2	1	5	4	3	2	1
(6) การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์อย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
27. โรงเรียนมีการใช้**รูปแบบการโค้ชและพี่เลี้ยง**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน**ด้านความเชื่อมโยง**ดังต่อไปนี้										
(1) การบูรณาการความรู้	5	4	3	2	1	5	4	3	2	1
(2) ความรู้พื้นฐาน	5	4	3	2	1	5	4	3	2	1
(3) ความเชื่อมโยงกับภายนอก	5	4	3	2	1	5	4	3	2	1
(4) หลักสูตรโดยใช้ปัญหาเป็นฐาน	5	4	3	2	1	5	4	3	2	1
28. โรงเรียนมีการใช้**รูปแบบการโค้ชและพี่เลี้ยง**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน**ด้านสภาพแวดล้อมห้องเรียนที่เอื้อต่อการเรียนรู้**ดังต่อไปนี้										
(1) นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้	5	4	3	2	1	5	4	3	2	1
(2) การสนับสนุนทางสภาพแวดล้อมและสังคม	5	4	3	2	1	5	4	3	2	1
(3) การมีส่วนร่วมทางวิชาการอย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
(4) เกณฑ์การประเมินผลที่ชัดเจน	5	4	3	2	1	5	4	3	2	1
(5) การกำกับตนเอง	5	4	3	2	1	5	4	3	2	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	สภาพปัจจุบัน					สภาพที่พึงประสงค์				
	5	4	3	2	1	5	4	3	2	1
29. โรงเรียนมีการใช้**รูปแบบการโค้ชและพี่เลี้ยง**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านการยอมรับความแตกต่าง**ดังต่อไปนี้										
(1) ความรู้เกี่ยวกับวัฒนธรรม	5	4	3	2	1	5	4	3	2	1
(2) การเข้าถึงนักเรียนอย่างทั่วถึง	5	4	3	2	1	5	4	3	2	1
(3) การบรรยายตามลำดับเหตุการณ์	5	4	3	2	1	5	4	3	2	1
(4) เอกลักษณ์กลุ่ม	5	4	3	2	1	5	4	3	2	1
(5) ความเป็นพลเมือง	5	4	3	2	1	5	4	3	2	1
30. โรงเรียนมีการใช้**รูปแบบการโค้ชและพี่เลี้ยง**ในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการใน **ด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา**ดังต่อไปนี้										
(1) ด้านความรู้ในเนื้อหา	5	4	3	2	1	5	4	3	2	1
(2) ด้านความรู้ในด้านศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(3) ด้านความรู้ในด้านเทคโนโลยี	5	4	3	2	1	5	4	3	2	1
(4) ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(5) ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(6) ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(7) ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	สภาพปัจจุบัน					สภาพที่พึงประสงค์				
	5	4	3	2	1	5	4	3	2	1
การพัฒนาครูโดยการส่งผ่าน: รูปแบบชุมชนนักปฏิบัติ										
31. โรงเรียนมีการใช้**รูปแบบชุมชนนักปฏิบัติ**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านคุณภาพทางปัญญา**ดังต่อไปนี้										
(1) ทักษะการคิดขั้นสูง	5	4	3	2	1	5	4	3	2	1
(2) ความรู้เชิงลึก	5	4	3	2	1	5	4	3	2	1
(3) ความเข้าใจเชิงลึก	5	4	3	2	1	5	4	3	2	1
(4) การสนทนาอย่างมีสาระสำคัญ	5	4	3	2	1	5	4	3	2	1
(5) ความรู้ที่เป็นปัญหา	5	4	3	2	1	5	4	3	2	1
(6) การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์อย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
32. โรงเรียนมีการใช้**รูปแบบชุมชนนักปฏิบัติ**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านความเชื่อมโยง**ดังต่อไปนี้										
(1) การบูรณาการความรู้	5	4	3	2	1	5	4	3	2	1
(2) ความรู้พื้นฐาน	5	4	3	2	1	5	4	3	2	1
(3) ความเชื่อมโยงกับภายนอก	5	4	3	2	1	5	4	3	2	1
(4) หลักสูตรโดยใช้ปัญหาเป็นฐาน	5	4	3	2	1	5	4	3	2	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	สภาพปัจจุบัน					สภาพที่พึงประสงค์				
	5	4	3	2	1	5	4	3	2	1
33. โรงเรียนมีการใช้**รูปแบบชุมชนนักปฏิบัติ**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านสภาพแวดล้อมห้องเรียนที่เอื้อต่อการเรียนรู้**ดังต่อไปนี้										
(1) นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้	5	4	3	2	1	5	4	3	2	1
(2) การสนับสนุนทางสภาพแวดล้อมและสังคม	5	4	3	2	1	5	4	3	2	1
(3) การมีส่วนร่วมทางวิชาการอย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
(4) เกณฑ์การประเมินผลที่ชัดเจน	5	4	3	2	1	5	4	3	2	1
(5) การกำกับตนเอง	5	4	3	2	1	5	4	3	2	1
34. โรงเรียนมีการใช้**รูปแบบชุมชนนักปฏิบัติ**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านการยอมรับความแตกต่าง**ดังต่อไปนี้										
(1) ความรู้เกี่ยวกับวัฒนธรรม	5	4	3	2	1	5	4	3	2	1
(2) การเข้าถึงนักเรียนอย่างทั่วถึง	5	4	3	2	1	5	4	3	2	1
(3) การบรรยายตามลำดับเหตุการณ์	5	4	3	2	1	5	4	3	2	1
(4) เอกลักษณ์กลุ่ม	5	4	3	2	1	5	4	3	2	1
(5) ความเป็นพลเมือง	5	4	3	2	1	5	4	3	2	1
35. โรงเรียนมีการใช้**รูปแบบชุมชนนักปฏิบัติ**ในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการใน **ด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา**ดังต่อไปนี้										
(1) ด้านความรู้ในเนื้อหา	5	4	3	2	1	5	4	3	2	1
(2) ด้านความรู้ในด้านศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(3) ด้านความรู้ในด้านเทคโนโลยี	5	4	3	2	1	5	4	3	2	1
(4) ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(5) ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(6) ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(7) ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	สภาพปัจจุบัน					สภาพที่พึงประสงค์				
	5	4	3	2	1	5	4	3	2	1
การพัฒนาครูโดยการเปลี่ยนแปลง: รูปแบบการวิจัยเชิงปฏิบัติการ										
36. โรงเรียนมีการใช้**รูปแบบการวิจัยเชิงปฏิบัติการ**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านคุณภาพทางปัญญา**ดังต่อไปนี้										
(1) ทักษะการคิดขั้นสูง	5	4	3	2	1	5	4	3	2	1
(2) ความรู้เชิงลึก	5	4	3	2	1	5	4	3	2	1
(3) ความเข้าใจเชิงลึก	5	4	3	2	1	5	4	3	2	1
(4) การสนทนาอย่างมีสาระสำคัญ	5	4	3	2	1	5	4	3	2	1
(5) ความรู้ที่เป็นปัญหา	5	4	3	2	1	5	4	3	2	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	สภาพปัจจุบัน					สภาพที่พึงประสงค์				
	5	4	3	2	1	5	4	3	2	1
(6) การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์ย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
37. โรงเรียนมีการใช้**รูปแบบการวิจัยเชิงปฏิบัติการ**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน**ด้านความเชื่อมโยง**ดังต่อไปนี้										
(1) การบูรณาการความรู้	5	4	3	2	1	5	4	3	2	1
(2) ความรู้พื้นฐาน	5	4	3	2	1	5	4	3	2	1
(3) ความเชื่อมโยงกับภายนอก	5	4	3	2	1	5	4	3	2	1
(4) หลักสูตรโดยใช้ปัญหาเป็นฐาน	5	4	3	2	1	5	4	3	2	1
38. โรงเรียนมีการใช้**รูปแบบการวิจัยเชิงปฏิบัติการ**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน**ด้านสภาพแวดล้อมห้องเรียนที่เอื้อต่อการเรียนรู้**ดังต่อไปนี้										
(1) นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้	5	4	3	2	1	5	4	3	2	1
(2) การสนับสนุนทางสภาพแวดล้อมและสังคม	5	4	3	2	1	5	4	3	2	1
(3) การมีส่วนร่วมทางวิชาการอย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
(4) เกณฑ์การประเมินผลที่ชัดเจน	5	4	3	2	1	5	4	3	2	1
(5) การกำกับตนเอง	5	4	3	2	1	5	4	3	2	1
39. โรงเรียนมีการใช้**รูปแบบการวิจัยเชิงปฏิบัติการ**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน**ด้านการยอมรับความแตกต่าง**ดังต่อไปนี้										
(1) ความรู้เกี่ยวกับวัฒนธรรม	5	4	3	2	1	5	4	3	2	1
(2) การเข้าถึงนักเรียนอย่างทั่วถึง	5	4	3	2	1	5	4	3	2	1
(3) การบรรยายตามลำดับเหตุการณ์	5	4	3	2	1	5	4	3	2	1
(4) เอกลักษณ์กลุ่ม	5	4	3	2	1	5	4	3	2	1
(5) ความเป็นพลเมือง	5	4	3	2	1	5	4	3	2	1
40. โรงเรียนมีการใช้**รูปแบบการวิจัยเชิงปฏิบัติการ**ในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการใน**ด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา**ดังต่อไปนี้										
(1) ด้านความรู้ในเนื้อหา	5	4	3	2	1	5	4	3	2	1
(2) ด้านความรู้ในด้านศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(3) ด้านความรู้ในด้านเทคโนโลยี	5	4	3	2	1	5	4	3	2	1
(4) ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(5) ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(6) ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(7) ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	สภาพปัจจุบัน					สภาพที่พึงประสงค์				
	5	4	3	2	1	5	4	3	2	1
การพัฒนาครูโดยการเปลี่ยนแปลง: รูปแบบการเปลี่ยนแปลง										
41. โรงเรียนมีการใช้**รูปแบบการเปลี่ยนแปลง**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านคุณภาพทางปัญญา**ดังต่อไปนี้										
(1) ทักษะการคิดขั้นสูง	5	4	3	2	1	5	4	3	2	1
(2) ความรู้เชิงลึก	5	4	3	2	1	5	4	3	2	1
(3) ความเข้าใจเชิงลึก	5	4	3	2	1	5	4	3	2	1
(4) การสนทนาอย่างมีสาระสำคัญ	5	4	3	2	1	5	4	3	2	1
(5) ความรู้ที่เป็นปัญหา	5	4	3	2	1	5	4	3	2	1
(6) การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์ย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
42. โรงเรียนมีการใช้**รูปแบบการเปลี่ยนแปลง**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านความเชื่อมโยง**ดังต่อไปนี้										
(1) การบูรณาการความรู้	5	4	3	2	1	5	4	3	2	1
(2) ความรู้พื้นฐาน	5	4	3	2	1	5	4	3	2	1
(3) ความเชื่อมโยงกับภายนอก	5	4	3	2	1	5	4	3	2	1
(4) หลักสูตรโดยใช้ปัญหาเป็นฐาน	5	4	3	2	1	5	4	3	2	1
43. โรงเรียนมีการใช้**รูปแบบการเปลี่ยนแปลง**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านสภาพแวดล้อมห้องเรียนที่เอื้อต่อการเรียนรู้**ดังต่อไปนี้										
(1) นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้	5	4	3	2	1	5	4	3	2	1
(2) การสนับสนุนทางสภาพแวดล้อมและสังคม	5	4	3	2	1	5	4	3	2	1
(3) การมีส่วนร่วมทางวิชาการอย่างลึกซึ้ง	5	4	3	2	1	5	4	3	2	1
(4) เกณฑ์การประเมินผลที่ชัดเจน	5	4	3	2	1	5	4	3	2	1
(5) การกำกับตนเอง	5	4	3	2	1	5	4	3	2	1
44. โรงเรียนมีการใช้**รูปแบบการเปลี่ยนแปลง**ในการพัฒนาครูเกี่ยวกับศาสตร์การสอนที่มีผลิตภาพใน **ด้านการยอมรับความแตกต่าง**ดังต่อไปนี้										
(1) ความรู้เกี่ยวกับวัฒนธรรม	5	4	3	2	1	5	4	3	2	1
(2) การเข้าถึงนักเรียนอย่างทั่วถึง	5	4	3	2	1	5	4	3	2	1
(3) การบรรยายตามลำดับเหตุการณ์	5	4	3	2	1	5	4	3	2	1
(4) เอกลักษณ์กลุ่ม	5	4	3	2	1	5	4	3	2	1
(5) ความเป็นพลเมือง	5	4	3	2	1	5	4	3	2	1
45. โรงเรียนมีการใช้**รูปแบบการเปลี่ยนแปลง**ในการพัฒนาครูเพื่อพัฒนาเกี่ยวกับความรู้บูรณาการใน **ด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา**ดังต่อไปนี้										
(1) ด้านความรู้ในเนื้อหา	5	4	3	2	1	5	4	3	2	1
(2) ด้านความรู้ในด้านศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(3) ด้านความรู้ในด้านเทคโนโลยี	5	4	3	2	1	5	4	3	2	1

การพัฒนารูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ	สภาพปัจจุบัน					สภาพที่พึงประสงค์				
	5	4	3	2	1	5	4	3	2	1
(4) ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(5) ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา	5	4	3	2	1	5	4	3	2	1
(6) ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน	5	4	3	2	1	5	4	3	2	1
(7) ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา	5	4	3	2	1	5	4	3	2	1

ขอขอบพระคุณในความอนุเคราะห์ของท่านเป็นอย่างสูงมา ณ โอกาสนี้

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Current state, desirable state, and priority need index of private school teacher development model based on the concepts of TPACK and productive pedagogies

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Current states		PNI Modified	Level
	$\bar{X}$	SD	$\bar{X}$	SD		
Teacher Development by Transmission: Training Model **1. The school uses the training model in developing teachers on productive pedagogies in intellectual quality aspect as follows:**	**3.88**	**0.95**	**3.43**	**0.92**	**0.133**	
1.1. Higher order thinking	3.88	0.92	3.54	0.95	0.095	4
1.3. Deep knowledge	3.84	0.98	3.38	0.86	0.135	3
1.4. Deep understanding	3.86	0.95	3.36	0.89	0.145	2
1.5. Substantive conversation	3.98	0.94	3.66	0.89	0.087	5
1.6. Knowledge problematic	3.88	1.00	3.41	0.98	0.135	3
1.7. Metalanguage	3.88	0.95	3.23	0.98	0.201	1
2. The school uses the training model in developing teachers on productive pedagogies in connectedness aspect as follows:	**4.14**	**0.84**	**3.78**	**0.89**	**0.096**	
2.1. Knowledge integration	4.16	0.87	3.94	0.88	0.055	4
2.2. Background knowledge	4.22	0.83	3.88	0.87	0.085	3
2.3. Connectedness to the world	4.12	0.83	3.65	0.89	0.128	1
2.4. Problem based curriculum	4.09	0.84	3.65	0.92	0.119	2
3. The school uses the training model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	**4.11**	**0.86**	**3.66**	**0.94**	**0.122**	
3.1. Student control	4.03	0.94	3.52	1.05	0.144	1
3.2. Social support	4.15	0.84	3.75	0.94	0.107	4
3.3. Engagement	4.08	0.84	3.59	0.99	0.136	2
3.4. Explicit criteria	4.16	0.86	3.78	0.84	0.100	5
3.5. Self-regulation	4.13	0.86	3.67	0.90	0.126	3
4. The school uses the training model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	**4.18**	**0.83**	**3.82**	**0.83**	**0.092**	
4.1. Cultural knowledge	4.20	0.81	3.83	0.85	0.098	2
4.2. Inclusivity	4.27	0.81	3.99	0.81	0.072	5
4.3. Narrative	4.13	0.81	3.77	0.81	0.095	3
4.4. Group identity	4.06	0.89	3.64	0.84	0.115	1
4.5. Citizenship	4.24	0.84	3.91	0.85	0.084	4
5. The school uses the training model in developing teachers on technological pedagogical content knowledge as follows:	**4.24**	**0.83**	**3.81**	**0.84**	**0.112**	
5.1. Content knowledge	4.26	0.82	3.94	0.82	0.082	7
5.2. Pedagogical knowledge	4.24	0.82	3.88	0.80	0.094	6
5.3. Technological knowledge	4.27	0.82	3.84	0.86	0.112	4
5.4. Pedagogical content knowledge	4.24	0.85	3.83	0.82	0.107	5
5.5. Technological content knowledge	4.23	0.84	3.75	0.86	0.127	3
5.6. Technological pedagogical knowledge	4.25	0.84	3.74	0.87	0.137	1
5.7. Technological pedagogical content knowledge	4.21	0.84	3.73	0.86	0.129	2
	4.11	**0.86**	**3.70**	**0.88**	**0.111**	

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Current states		PNI Modified	Level
	$\bar{X}$	SD	$\bar{X}$	SD		
Teacher Development by Transmission: Award-Bearing Model 6. The school uses the award-bearing model in developing teachers on productive pedagogies in intellectual quality aspect as follows:	**3.99**	**0.90**	**3.45**	**0.93**	**0.155**	
6.1. Higher order thinking	4.02	0.89	3.52	0.99	0.141	6
6.2. Deep knowledge	3.96	0.90	3.45	0.94	0.149	5
6.3. Deep understanding	3.97	0.90	3.41	0.91	0.163	2
6.4. Substantive conversation	4.07	0.90	3.54	0.94	0.150	4
6.5. Knowledge problematic	3.95	0.95	3.43	0.90	0.151	3
6.6. Metalanguage	4.00	0.89	3.38	0.95	0.180	1
7. The school uses the award-bearing model in developing teachers on productive pedagogies in connectedness aspect as follows:	**4.14**	**0.83**	**3.70**	**0.90**	**0.118**	
7.1. Knowledge integration	4.15	0.81	3.77	0.91	0.100	4
7.2. Background knowledge	4.16	0.84	3.76	0.86	0.106	3
7.3. Connectedness to the world	4.15	0.83	3.69	0.92	0.126	2
7.4. Problem based curriculum	4.13	0.87	3.61	0.93	0.142	1
8. The school uses the award-bearing model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	**4.07**	**0.89**	**3.62**	**0.88**	**0.123**	
8.1. Student control	3.99	0.91	3.54	0.89	0.128	2
8.2. Social support	4.12	0.84	3.69	0.87	0.117	4
8.3. Engagement	4.07	0.89	3.57	0.91	0.139	1
8.4. Explicit criteria	4.10	0.90	3.68	0.87	0.114	5
8.5. Self-regulation	4.07	0.91	3.64	0.86	0.118	3
9. The school uses the award-bearing model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	**4.15**	**0.85**	**3.71**	**0.89**	**0.115**	
9.1. Cultural knowledge	4.18	0.83	3.76	0.92	0.109	4
9.2. Inclusivity	4.21	0.87	3.81	0.92	0.102	5
9.3. Narrative	4.12	0.82	3.65	0.89	0.128	1
9.4. Group identity	4.03	0.92	3.57	0.87	0.127	2
9.5. Citizenship	4.23	0.83	3.80	0.89	0.110	3
10. The school uses the award-bearing model in developing teachers on technological pedagogical content knowledge as follows:	**4.19**	**0.83**	**3.74**	**0.86**	**0.122**	
10.1. Content knowledge	4.17	0.84	3.81	0.85	0.093	7
10.2. Pedagogical knowledge	4.22	0.82	3.76	0.81	0.123	3
10.3. Technological knowledge	4.23	0.8	3.77	0.85	0.120	5
10.4. Pedagogical content knowledge	4.16	0.84	3.73	0.87	0.114	6
10.5. Technological content knowledge	4.2	0.84	3.74	0.87	0.122	4
10.6. Technological pedagogical knowledge	4.19	0.86	3.68	0.90	0.140	2
10.7. Technological pedagogical content knowledge	4.22	0.83	3.69	0.88	0.143	1
	4.10	**0.86**	**3.64**	**0.89**	**0.126**	

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Current states		PNI Modified	Level
	$\bar{X}$	SD	$\bar{X}$	SD		
Teacher Development by Transmission: Deficit Model 11. The school uses the deficit model in developing teachers on productive pedagogies in intellectual quality aspect as follows:	**3.99**	**0.90**	**3.49**	**0.89**	**0.140**	
11.1. Higher order thinking	3.99	0.92	3.54	0.92	0.125	5
11.2. Deep knowledge	4.00	0.88	3.48	0.89	0.147	3
11.3. Deep understanding	3.98	0.88	3.45	0.90	0.152	2
11.4. Substantive conversation	4.05	0.88	3.63	0.84	0.115	6
11.5. Knowledge problematic	3.95	0.93	3.49	0.90	0.131	4
11.6. Metalanguage	3.97	0.92	3.39	0.94	0.170	1
12. The school uses the deficit model in developing teachers on productive pedagogies in connectedness aspect as follows:	**4.10**	**0.83**	**3.63**	**0.87**	**0.132**	
12.1. Knowledge integration	4.13	0.80	3.69	0.89	0.119	3
12.2. Background knowledge	4.13	0.85	3.73	0.83	0.108	4
12.3. Connectedness to the world	4.07	0.82	3.57	0.88	0.141	2
12.4. Problem based curriculum	4.10	0.85	3.53	0.88	0.160	1
13. The school uses the deficit model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	**4.09**	**0.85**	**3.62**	**0.88**	**0.130**	
13.1. Student control	4.03	0.92	3.53	0.96	0.143	1
13.2. Social support	4.11	0.82	3.67	0.89	0.119	3
13.3. Engagement	4.10	0.86	3.61	0.89	0.135	2
13.4. Explicit criteria	4.15	0.84	3.71	0.85	0.118	4
13.5. Self-regulation	4.09	0.85	3.60	0.84	0.135	2
14. The school uses the deficit model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	**4.11**	**0.83**	**3.67**	**0.84**	**0.118**	
14.1. Cultural knowledge	4.11	0.84	3.72	0.85	0.106	4
14.2. Inclusivity	4.12	0.83	3.74	0.81	0.101	5
14.3. Narrative	4.08	0.83	3.65	0.84	0.119	2
14.4. Group identity	4.07	0.87	3.52	0.87	0.156	1
14.5. Citizenship	4.17	0.82	3.76	0.85	0.109	3
15. The school uses the deficit model in developing teachers on technological pedagogical content knowledge as follows:	**4.14**	**0.84**	**3.66**	**0.81**	**0.129**	
15.1. Content knowledge	4.15	0.80	3.75	0.79	0.106	7
15.2. Pedagogical knowledge	4.12	0.81	3.70	0.83	0.112	6
15.3. Technological knowledge	4.14	0.87	3.72	0.79	0.113	5
15.4. Pedagogical content knowledge	4.14	0.87	3.68	0.83	0.124	4
15.5. Technological content knowledge	4.15	0.87	3.61	0.82	0.148	2
15.6. Technological pedagogical knowledge	4.13	0.84	3.61	0.82	0.142	3
15.7. Technological pedagogical content knowledge	4.15	0.86	3.58	0.83	0.160	1
	4.08	**0.85**	**3.61**	**0.85**	**0.133**	

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Current states		PNI Modified	Level
	$\bar{X}$	SD	$\bar{X}$	SD		
Teacher Development by Transmission: Cascade Model 16. The school uses the cascade model in developing teachers on productive pedagogies in intellectual quality aspect as follows:	**4.00**	**0.90**	**3.47**	**0.90**	**0.150**	
16.1. Higher order thinking	4.03	0.88	3.54	0.87	0.137	5
16.2. Deep knowledge	4.00	0.90	3.46	0.89	0.156	2
16.3. Deep understanding	4.00	0.92	3.46	0.91	0.154	3
16.4. Substantive conversation	4.04	0.87	3.54	0.90	0.141	4
16.5. Knowledge problematic	3.97	0.92	3.49	0.92	0.136	6
16.6. Metalanguage	3.98	0.94	3.38	0.96	0.177	1
17. The school uses the cascade model in developing teachers on productive pedagogies in connectedness aspect as follows:	**4.17**	**0.82**	**3.68**	**0.85**	**0.131**	
17.1. Knowledge integration	4.14	0.81	3.72	0.86	0.111	4
17.2. Background knowledge	4.19	0.84	3.74	0.80	0.121	3
17.3. Connectedness to the world	4.19	0.80	3.66	0.85	0.144	2
17.4. Problem based curriculum	4.17	0.84	3.63	0.91	0.148	1
18. The school uses the cascade model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	**4.16**	**0.84**	**3.64**	**0.87**	**0.141**	
18.1. Student control	4.10	0.87	3.60	0.93	0.136	4
18.2. Social support	4.19	0.82	3.68	0.86	0.138	3
18.3. Engagement	4.19	0.85	3.63	0.86	0.154	1
18.4. Explicit criteria	4.19	0.83	3.70	0.88	0.130	5
18.5. Self-regulation	4.14	0.86	3.61	0.84	0.147	2
19. The school uses the cascade model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	**4.15**	**0.85**	**3.68**	**0.88**	**0.129**	
19.1. Cultural knowledge	4.15	0.86	3.72	0.86	0.115	4
19.2. Inclusivity	4.23	0.83	3.79	0.86	0.116	3
19.3. Narrative	4.15	0.84	3.62	0.87	0.147	2
19.4. Group identity	4.10	0.87	3.56	0.91	0.151	1
19.5. Citizenship	4.15	0.86	3.72	0.92	0.116	3
20. The school uses the cascade model in developing teachers on technological pedagogical content knowledge as follows:	**4.16**	**0.86**	**3.65**	**0.84**	**0.139**	
20.1. Content knowledge	4.19	0.82	3.75	0.83	0.118	7
20.2. Pedagogical knowledge	4.17	0.87	3.71	0.82	0.123	6
20.3. Technological knowledge	4.17	0.85	3.65	0.89	0.143	5
20.4. Pedagogical content knowledge	4.17	0.88	3.64	0.84	0.144	4
20.5. Technological content knowledge	4.16	0.87	3.59	0.85	0.158	1
20.6. Technological pedagogical knowledge	4.16	0.85	3.63	0.85	0.147	2
20.7. Technological pedagogical content knowledge	4.14	0.89	3.61	0.86	0.146	3
	4.12	**0.85**	**3.62**	**0.86**	**0.138**	

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Current states		PNI Modified	Level
	$\bar{X}$	SD	$\bar{X}$	SD		
Teacher Development by Transitional: Standard-Based Model 21. The school uses the standard-based model in developing teachers on productive pedagogies in intellectual quality aspect as follows:	**4.12**	**0.85**	**3.59**	**0.89**	**0.147**	
21.1. Higher order thinking	4.11	0.86	3.64	0.89	0.130	6
21.2. Deep knowledge	4.15	0.85	3.59	0.84	0.155	2
21.3. Deep understanding	4.09	0.86	3.55	0.91	0.153	3
21.4. Substantive conversation	4.14	0.84	3.66	0.86	0.132	5
21.5. Knowledge problematic	4.11	0.87	3.59	0.93	0.146	4
21.6. Metalanguage	4.14	0.84	3.53	0.92	0.170	1
22. The school uses the standard-based model in developing teachers on productive pedagogies in connectedness aspect as follows:	**4.24**	**0.80**	**3.74**	**0.86**	**0.131**	
22.1. Knowledge integration	4.26	0.80	3.76	0.86	0.130	3
22.2. Background knowledge	4.23	0.82	3.76	0.83	0.123	4
22.3. Connectedness to the world	4.25	0.77	3.73	0.85	0.138	1
22.4. Problem based curriculum	4.22	0.81	3.72	0.9	0.136	2
23. The school uses the standard-based model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	**4.13**	**0.84**	**3.65**	**0.91**	**0.129**	
23.1. Student control	4.13	0.85	3.64	0.96	0.133	3
23.2. Social support	4.15	0.84	3.72	0.89	0.117	4
23.3. Engagement	4.11	0.84	3.62	0.92	0.135	2
23.4. Explicit criteria	4.15	0.85	3.70	0.88	0.100	5
23.5. Self-regulation	4.15	0.84	3.57	0.93	0.160	1
24. The school uses the standard-based model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	**4.23**	**0.82**	**3.70**	**0.89**	**0.141**	
24.1. Cultural knowledge	4.20	0.83	3.74	0.91	0.123	5
24.2. Inclusivity	4.29	0.82	3.74	0.88	0.148	3
24.3. Narrative	4.21	0.83	3.63	0.92	0.157	1
24.4. Group identity	4.20	0.83	3.65	0.87	0.152	2
24.5. Citizenship	4.25	0.81	3.78	0.91	0.125	4
25. The school uses the standard-based model in developing teachers on technological pedagogical content knowledge as follows:	**4.21**	**0.84**	**3.67**	**0.90**	**0.143**	
25.1. Content knowledge	4.24	0.84	3.76	0.88	0.126	6
25.2. Pedagogical knowledge	4.25	0.82	3.72	0.86	0.141	4
25.3. Technological knowledge	4.22	0.82	3.71	0.89	0.137	5
25.4. Pedagogical content knowledge	4.22	0.84	3.68	0.91	0.146	3
25.5. Technological content knowledge	4.18	0.88	3.65	0.88	0.146	3
25.6. Technological pedagogical knowledge	4.18	0.85	3.61	0.93	0.155	2
25.7. Technological pedagogical content knowledge	4.18	0.88	3.61	0.96	0.156	1
	4.18	**0.83**	**3.67**	**0.89**	**0.138**	

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Current states		PNI Modified	Level
	$\bar{X}$	SD	$\bar{X}$	SD		
Teacher Development by Transitional: Coaching/Mentoring Model 26. The school uses the coaching/mentoring model in developing teachers on productive pedagogies in intellectual quality aspect as follows:	**4.01**	**0.92**	**3.46**	**0.93**	**0.157**	
26.1. Higher order thinking	4.01	0.92	3.52	0.94	0.138	6
26.2. Deep knowledge	4.02	0.89	3.47	0.89	0.157	3
26.3. Deep understanding	4.04	0.92	3.44	0.92	0.173	2
26.4. Substantive conversation	4.06	0.90	3.54	0.90	0.146	5
26.5. Knowledge problematic	4.00	0.96	3.46	0.96	0.155	4
26.6. Metalanguage	3.96	0.96	3.36	0.97	0.178	1
27. The school uses the coaching/mentoring model in developing teachers on productive pedagogies in connectedness aspect as follows:	**4.11**	**0.85**	**3.62**	**0.89**	**0.135**	
27.1. Knowledge integration	4.09	0.85	3.68	0.90	0.110	4
27.2. Background knowledge	4.17	0.84	3.67	0.89	0.136	3
27.3. Connectedness to the world	4.10	0.85	3.58	0.86	0.144	2
27.4. Problem based curriculum	4.09	0.88	3.55	0.91	0.151	1
28. The school uses the coaching/mentoring model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	**4.14**	**0.84**	**3.64**	**0.89**	**0.138**	
28.1. Student control	4.07	0.89	3.60	0.96	0.131	4
28.2. Social support	4.16	0.80	3.71	0.86	0.122	5
28.3. Engagement	4.14	0.84	3.64	0.89	0.138	3
28.4. Explicit criteria	4.20	0.81	3.68	0.89	0.142	2
28.5. Self-regulation	4.15	0.86	3.58	0.88	0.158	1
29. The school uses the coaching/mentoring model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	**4.13**	**0.85**	**3.63**	**0.92**	**0.134**	
29.1. Cultural knowledge	4.11	0.86	3.67	0.94	0.121	4
29.2. Inclusivity	4.17	0.83	3.73	0.91	0.118	5
29.3. Narrative	4.14	0.86	3.60	0.90	0.148	2
29.4. Group identity	4.08	0.86	3.54	0.91	0.152	1
29.5. Citizenship	4.15	0.87	3.65	0.96	0.135	3
30. The school uses the coaching/mentoring model in developing teachers on technological pedagogical content knowledge as follows:	**4.15**	**0.85**	**3.61**	**0.89**	**0.151**	
30.1. Content knowledge	4.18	0.84	3.67	0.89	0.138	5
30.2. Pedagogical knowledge	4.16	0.86	3.67	0.85	0.133	6
30.3. Technological knowledge	4.15	0.89	3.63	0.94	0.142	4
30.4. Pedagogical content knowledge	4.15	0.85	3.62	0.93	0.148	3
30.5. Technological content knowledge	4.15	0.87	3.56	0.90	0.165	2
30.6. Technological pedagogical knowledge	4.15	0.84	3.56	0.88	0.166	1
30.7. Technological pedagogical content knowledge	4.16	0.85	3.57	0.87	0.165	2
	4.10	**0.86**	**3.46**	**0.90**	**0.142**	

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Current states		PNI Modified	Level
	$\bar{X}$	SD	$\bar{X}$	SD		
Teacher Development by Transitional: Community of Practice Model 31. The school uses the community of practice model in developing teachers on productive pedagogies in intellectual quality aspect as follows:	**4.00**	**0.86**	**3.37**	**0.92**	**0.184**	
31.1. Higher order thinking	3.96	0.86	3.38	0.92	0.171	5
31.2. Deep knowledge	3.99	0.85	3.38	0.90	0.180	3
31.3. Deep understanding	4.01	0.86	3.33	0.93	0.205	1
31.4. Substantive conversation	4.04	0.87	3.43	0.89	0.177	4
31.5. Knowledge problematic	4.00	0.89	3.40	0.92	0.177	4
31.6. Metalanguage	4.01	0.88	3.35	0.96	0.195	2
32. The school uses the community of practice model in developing teachers on productive pedagogies in connectedness aspect as follows:	**4.07**	**0.87**	**3.52**	**0.90**	**0.157**	
32.1. Knowledge integration	4.08	0.85	3.53	0.90	0.157	3
32.2. Background knowledge	4.09	0.87	3.53	0.91	0.159	1
32.3. Connectedness to the world	4.08	0.87	3.53	0.90	0.158	2
32.4. Problem based curriculum	4.05	0.89	3.50	0.91	0.157	3
33. The school uses the community of practice model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	**4.07**	**0.87**	**3.46**	**0.91**	**0.177**	
33.1. Student control	4.05	0.89	3.46	0.92	0.169	4
33.2. Social support	4.08	0.85	3.52	0.91	0.161	5
33.3. Engagement	4.06	0.88	3.42	0.94	0.188	1
33.4. Explicit criteria	4.10	0.89	3.45	0.89	0.187	2
33.5. Self-regulation	4.10	0.86	3.46	0.89	0.184	3
34. The school uses the community of practice model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	**4.09**	**0.88**	**3.57**	**0.86**	**0.145**	
34.1. Cultural knowledge	4.06	0.88	3.64	0.88	0.115	4
34.2. Inclusivity	4.10	0.88	3.60	0.87	0.139	3
34.3. Narrative	4.09	0.90	3.53	0.90	0.159	1
34.4. Group identity	4.05	0.89	3.50	0.84	0.159	1
34.5. Citizenship	4.17	0.88	3.60	0.85	0.156	2
35. The school uses the community of practice model in developing teachers on technological pedagogical content knowledge as follows:	**4.06**	**0.88**	**3.50**	**0.90**	**0.159**	
35.1. Content knowledge	4.05	0.87	3.57	0.88	0.133	7
35.2. Pedagogical knowledge	4.06	0.87	3.52	0.88	0.153	6
35.3. Technological knowledge	4.09	0.88	3.50	0.93	0.167	3
35.4. Pedagogical content knowledge	4.08	0.88	3.50	0.91	0.163	4
35.5. Technological content knowledge	4.06	0.90	3.46	0.94	0.172	1
35.6. Technological pedagogical knowledge	4.06	0.89	3.50	0.89	0.158	5
35.7. Technological pedagogical content knowledge	4.06	0.89	3.47	0.88	0.169	2
	4.06	**0.87**	**3.48**	**0.89**	**0.167**	

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Current states		PNI Modified	Level
	$\bar{X}$	SD	$\bar{X}$	SD		
Teacher Development by Transformative: Action Research Model 36. The school uses the action research model in developing teachers on productive pedagogies in intellectual quality aspect as follows:	**3.98**	**0.89**	**3.34**	**0.96**	**0.192**	
36.1. Higher order thinking	3.96	0.89	3.36	0.94	0.177	6
36.2. Deep knowledge	3.98	0.87	3.33	0.92	0.195	4
36.3. Deep understanding	3.99	0.93	3.33	0.94	0.198	3
36.4. Substantive conversation	4.00	0.89	3.39	1.00	0.180	5
36.5. Knowledge problematic	4.02	0.88	3.34	1.00	0.203	1
36.6. Metalanguage	3.97	0.93	3.30	0.98	0.202	2
37. The school uses the action research model in developing teachers on productive pedagogies in connectedness aspect as follows:	**4.09**	**0.85**	**3.48**	**0.89**	**0.173**	
37.1. Knowledge integration	4.08	0.88	3.50	0.86	0.164	4
37.2. Background knowledge	4.13	0.83	3.53	0.93	0.173	2
37.3. Connectedness to the world	4.07	0.85	3.43	0.86	0.185	1
37.4. Problem based curriculum	4.08	0.85	3.48	0.93	0.172	3
38. The school uses the action research model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	**4.08**	**0.87**	**3.45**	**0.92**	**0.182**	
38.1. Student control	4.04	0.87	3.44	0.96	0.174	4
38.2. Social support	4.11	0.85	3.52	0.91	0.166	5
38.3. Engagement	4.09	0.87	3.41	0.91	0.199	1
38.4. Explicit criteria	4.10	0.88	3.46	0.93	0.184	3
38.5. Self-regulation	4.06	0.88	3.42	0.90	0.189	2
39. The school uses the action research model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	**4.08**	**0.88**	**3.47**	**0.95**	**0.173**	
39.1. Cultural knowledge	4.09	0.87	3.54	0.99	0.154	5
39.2. Inclusivity	4.09	0.91	3.50	0.97	0.169	3
39.3. Narrative	4.07	0.88	3.43	0.95	0.185	2
39.4. Group identity	4.06	0.89	3.39	0.93	0.194	1
39.5. Citizenship	4.11	0.89	3.53	0.94	0.164	4
40. The school uses the action research model in developing teachers on technological pedagogical content knowledge as follows:	**4.11**	**0.88**	**3.47**	**0.92**	**0.184**	
40.1. Content knowledge	4.12	0.88	3.52	0.92	0.170	6
40.2. Pedagogical knowledge	4.12	0.88	3.51	0.89	0.174	5
40.3. Technological knowledge	4.11	0.89	3.45	0.93	0.191	2
40.4. Pedagogical content knowledge	4.12	0.90	3.46	0.92	0.189	3
40.5. Technological content knowledge	4.11	0.88	3.45	0.93	0.191	2
40.6. Technological pedagogical knowledge	4.11	0.86	3.47	0.93	0.186	4
40.7. Technological pedagogical content knowledge	4.13	0.89	3.46	0.98	0.192	1
	4.07	**0.87**	**3.44**	**0.92**	**0.180**	

The Development of Private School Teacher Development Model Based on the Concepts of TPACK and Productive Pedagogies	Desirable states		Current states		PNI Modified	Level
	$\bar{X}$	SD	$\bar{X}$	SD		
Teacher Development by Transformative: Transformative Model 41. The school uses the transformative model in developing teachers on productive pedagogies in intellectual quality aspect as follows:	**4.01**	**0.92**	**3.47**	**0.92**	**0.153**	
41.1. Higher order thinking	4.00	0.89	3.53	0.94	0.132	6
41.2. Deep knowledge	3.98	0.94	3.46	0.91	0.150	4
41.3. Deep understanding	4.00	0.93	3.44	0.88	0.162	2
41.4. Substantive conversation	4.06	0.91	3.53	0.91	0.149	5
41.5. Knowledge problematic	4.01	0.97	3.48	0.94	0.152	3
41.6. Metalanguage	4.01	0.92	3.42	0.96	0.174	1
42. The school uses the transformative model in developing teachers on productive pedagogies in connectedness aspect as follows:	**4.13**	**0.86**	**3.62**	**0.89**	**0.140**	
42.1. Knowledge integration	4.16	0.83	3.65	0.91	0.141	3
42.2. Background knowledge	4.14	0.87	3.65	0.85	0.135	4
42.3. Connectedness to the world	4.12	0.87	3.61	0.91	0.142	2
42.4. Problem based curriculum	4.11	0.88	3.59	0.92	0.145	1
43. The school uses the transformative model in developing teachers on productive pedagogies in supportive classroom environment aspect as follows:	**4.10**	**0.87**	**3.59**	**0.91**	**0.139**	
43.1. Student control	4.07	0.89	3.60	0.93	0.129	4
43.2. Social support	4.14	0.85	3.66	0.87	0.131	3
43.3. Engagement	4.08	0.86	3.57	0.91	0.145	2
43.4. Explicit criteria	4.09	0.86	3.62	0.91	0.129	4
43.5. Self-regulation	4.12	0.89	3.53	0.93	0.165	1
44. The school uses the transformative model in developing teachers on productive pedagogies in recognition of difference aspect as follows:	**4.15**	**0.87**	**3.63**	**0.90**	**0.143**	
44.1. Cultural knowledge	4.20	0.86	3.69	0.90	0.135	4
44.2. Inclusivity	4.18	0.88	3.69	0.90	0.133	3
44.3. Narrative	4.12	0.90	3.57	0.88	0.152	2
44.4. Group identity	4.11	0.85	3.53	0.94	0.162	1
44.5. Citizenship	4.18	0.89	3.68	0.92	0.133	3
45. The school uses the transformative model in developing teachers on technological pedagogical content knowledge as follows:	**4.17**	**0.85**	**3.61**	**0.89**	**0.154**	
45.1. Content knowledge	4.20	0.82	3.67	0.88	0.145	5
45.2. Pedagogical knowledge	4.19	0.85	3.67	0.85	0.142	6
45.3. Technological knowledge	4.18	0.88	3.65	0.92	0.142	6
45.4. Pedagogical content knowledge	4.16	0.84	3.61	0.90	0.152	4
45.5. Technological content knowledge	4.17	0.84	3.58	0.91	0.166	2
45.6. Technological pedagogical knowledge	4.14	0.86	3.53	0.91	0.173	1
45.7. Technological pedagogical content knowledge	4.16	0.86	3.58	0.89	0.160	3
	4.11	**0.87**	**3.58**	**0.90**	**0.148**	
Total all	**4.10**	**0.85**	**3.58**	**0.88**	**4.10**	

รูปแบบการพัฒนาครูโรงเรียนเอกชน “แอคโมลเดล”

ACCT Teacher Development Model

ชื่ออาจารย์ที่ปรึกษาหลัก	ศาสตราจารย์ ดร.พฤทธิ์ ศิริบรรณพิทักษ์
ชื่ออาจารย์ที่ปรึกษาร่วม	ผู้ช่วยศาสตราจารย์ ดร.นันทรัตน์ เจริญกุล
ชื่อนิสิตผู้เสนอวิทยานิพนธ์	นายณัฐวุฒิ เกตุไชโย
	นิสิตปริญญาดุษฎีบัณฑิต สาขาวิชาบริหารการศึกษา
	ภาควิชานโยบายการจัดการ และความเป็นผู้นำทางการศึกษา
	คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

1. Teacher Development Model Title: ACCT Teacher Development Model

A from Action Research Model

C from Coaching and mentoring Model

C from Community of practice Model

T from Transformation Model

2. Importance of Teacher Development Model

The effectiveness of administrators is a key to drive organizations or schools. Superintendents, principals, and others with authority in school systems are instrumental in providing the vision, time, and resources to support continual professional learning, a positive school climate, and success for all students. Administrators are in charge and responsible for planning resources such as man, money, materials and methods to bring out an effective organization or school. One of the important resources in all organizations is man or employees; in school context, it is teachers. School administrators have to support and enhance teachers' knowledge, capability, skills etc. so they can bring success for all students.

In this case, we will focus on an area of out-of-field teacher development. According to Hobbs (2012), school administrators need to consider the school context, school support and development plans, and teachers' prior knowledge and relating knowledge to out-of-field teachers in developing a professional development program for out-of-field teachers. She further explains that there is still a lack of understanding of the significance of out-of-field teaching experiences and it is an international concern to perceive that it is acceptable to put out-of-field teachers to positions out of their field. From the statements, we can see that there are special characteristics of out-of-field teachers and it is the reason why we need to pay attention to this.

Specifically in Thailand where we have many "out-of-field" teachers, we need to make sure that they feel confident in teaching and support them on their teaching practice. According to Prahakul and Traiwichikhun (2016), it is found that 59.4 % of Thai teachers who are working under the Office of Primary Education Service Areas have been assigned to teach out-of-field and there is a significant impact on student's academic achievement comparing to in-field teachers. While a lack of qualify teachers causes the school to put teacher out-of-field, private schools in Thailand can hire a person who does not have a degree in education to teach in schools through a temporary teaching license (Kurusapha, 2014). This means all private schools in Thailand can hire a person who does not have educational degrees. As mentioned earlier, there is a significant difference between in-field and out-of-field teacher quality; it is urging us to look into ways to develop teachers who are out-of-field, especially those who are working in private schools. Some out-of-field teachers are assigned to positions for which they are not suitably qualified. One way to support them is through professional

development. Teachers who go through a professional development program will be equipped with capability to teach and ways to raise students' achievement.

However, there are many factors that contribute to a student's achievement, including individual characteristics, family, and community, for example. But research suggests that, among school-related factors, teachers matter most. When it comes to student performance, teachers estimated to have two to three times in comparison with the impact of any other school factors, including services, facilities, and even leadership. (McCaffrey, Lockwood, Koretz, & Hamilton, 2003; Rowan, Correnti & Miller, 2002; Rivkin, Hanushek, & Kain, 2000) As we can see, school administrators are key people to drive schools and are those who bring success for all stakeholders including teachers, students, parents, and ultimately society.

In order to find the find the models that schools should use to develop out of field teachers, the research studied the current and desirable states of private school teacher development model based on the concepts of TPACK and productive pedagogies. The researcher sent out questionnaire to 326 private schools around Thailand. The informants were school administrator and out of field teacher. From the data gathered we then performed an analysis of Modified priority need index of teacher development model we found that 4 models has a high priority needs high than average (Mean PNI= 0.141) which are the action research model (PNI= 0.180), The community of practice (PNI= 0.167), The transformative model (PNI=0.148), and The coaching and mentoring model (PNI=0.142).

For the analysis of modified priority need index of productive pedagogies we found two aspects that have higher than average mean of modified priority need index (Mean PNI=0.141) which are intellectual quality (PNI=0.152) and supportive classroom environment (PNI= 0.142). When we consider each item of intellectual quality aspect we found that metalnaguage (PNI= 0.183), deep knowledge (PNI= 0.158), and knowledge problematic (PNI= 0.154) have modified priority need index higher than average. While supportive classroom environment aspect we found that self-regulation (PNI= 0.153), engagement (PNI=0.152), and student control (PNI=0.143) have modified priority need index higher than average.

For the analysis of modified priority need index of technological pedagogical content knowledge we found four knowledge that have higher than average mean of modified priority need index (Mean PNI=0.143) which are technological pedagogical content knowledge (PNI= 0.157), technological pedagogical knowledge (PNI= 0.156), technological content knowledge (PNI=0.155), and pedagogical content knowledge (PNI=0.143).

From the analysis of modified priority need index we can design private school teacher development model based on the concepts of TPACK and productive pedagogies (1st draft).

3. Objectives of teacher development model

3.1. To develop private school out of field teacher with mixed approaches and models.

3.2 To develop private school out of field teacher on technological pedagogical content knowledge and productive pedagogies.

3.3 To develop private school out of field teacher teaching in order to elevate student's academic achievement.

4. Teacher development model main characteristics

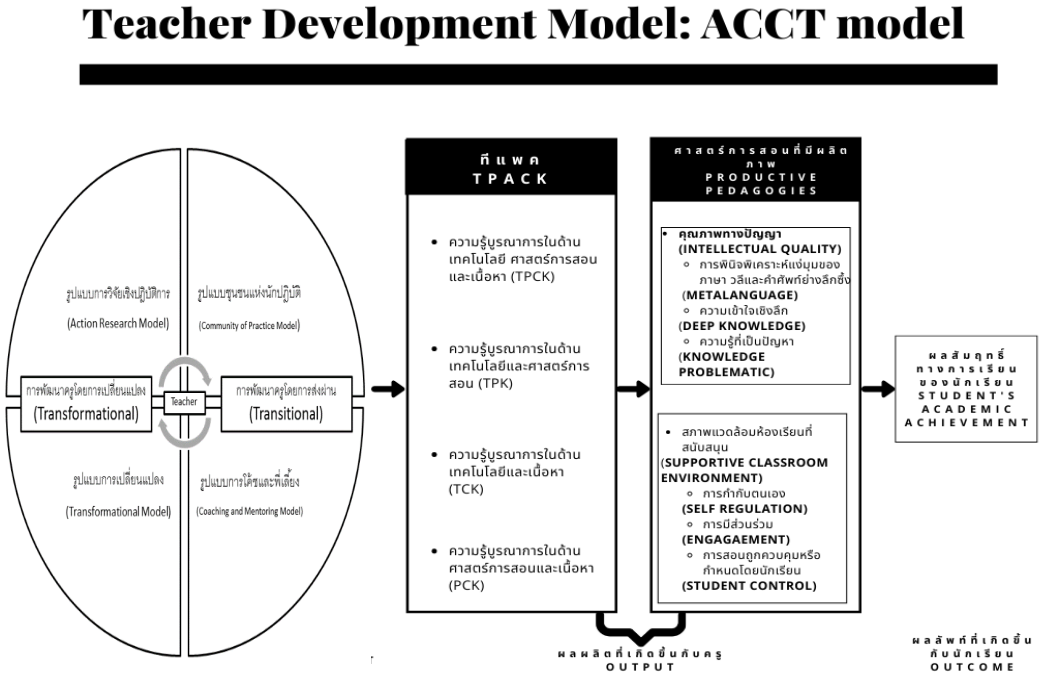

Figure 1 shows (First draft) ACCT teacher development model

4.1 Approaches for teacher development: there are two approaches for developing teacher in this model. The first one is transitional approach, the main characteristic of this approach is that it relies on both experts and community as a knowledge platform and community of practice. It reflects the reflective dialogue where constant feedback is an ongoing process. While certain level of autonomy depends on the role of the participants.

While transformational approach suggests strong links between theory and practice, internalisation of concepts, reflection, construction of new knowledge and its application in different situations, and an awareness of the professional and political context. Transformative models of CPD have the capacity to support considerable professional autonomy at both individual and profession-wide levels. There are two development models in each approach as follows:

Teacher development in transition approach

1) Teacher development in transitional approach by community of practice model: The community of practice model refers model that evolving forms of mutual engagement that happens as a result of that community and its interaction that promote community of practice and generally involves more than two people. The community is central to the internalization of professional development.

2) Teacher development in transitional approach by coaching and mentoring model: The coaching/mentoring model refers to model that covers a variety of professional development practices that are based on a range of philosophical premises. However, the defining characteristic of this model is the importance of the one-to-one relationship, generally between two teachers, which is designed to support professional development.

Teacher development in transformational approach

1) Teacher development in transformational approach by action research model: The action research model refers to the study of a social situation, involving the participants themselves as researchers, with a view to improving the quality of action within it. The 'quality of action' can be perceived as the participants' understanding of the situation, as well as the practice within the situation

2) Teacher development in transformational approach by transformational model: The transformative model refers to a model that supports educational change with professional development that involves the combination of a number of processes and conditions – aspects of which are drawn from other models. The central characteristic is the combination of practices and conditions that support a transformative agenda. In this sense, it could be argued that the transformative model is not a clearly definable model in itself; rather it recognises the range of different conditions required for transformative practice. The key characteristic of the transformative model is its effective integration of the range of models described above, together with a real sense of awareness of issues of power, i.e. whose agendas are being addressed through the process.

4. 2) Output of teacher development: Technological pedagogical content knowledge and productive pedagogies

TPACK refers to the complex interplay of three primary forms of knowledge, which are technological knowledge, pedagogical knowledge and content knowledge. And productive pedagogies are the twenty productive Pedagogies under the four dimensions that are constructed in the productive pedagogies classroom reflection manual, as a guide from Queensland education, to provide an index of quality teaching and students' learning and to be used to help teachers to reflect on their classroom practices and generating professional development dialogue. Productive pedagogies dimensions, items and key questions addressed are (The State of Queensland, Department of Education, 2002).

Technological pedagogical content knowledge for this (drafted) teacher development model

1) Pedagogical Content Knowledge (PCK) refers to knowledge of pedagogy that is applicable to the teaching of specific content. It is the notion of the transformation of the subject matter for teaching.

2) Technological Content Knowledge (TCK) refers to an understanding of the manner in which technology and content influence and constrain one another.

3) Technological Pedagogical Knowledge (TPK) refers to an understanding of how teaching and learning can change when particular technologies are used in particular ways.

4) Technological Pedagogical Content Knowledge (TPACK) refers to a deeply skilled teaching with technology. It is the basis of effective teaching with technology, requiring an understanding of the presentation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help address some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones.

Productive pedagogies for this (draft) teacher development model

Productive pedagogies express the meaning and value of what "quality teaching" might look like and provide a descriptive language to support and engage teachers with sustained professional dialogue about their practices and performances These two dimensions can provide teachers with a snapshot of their classroom practices that should be present to ensure that the intellectual and social outcomes of all students are improved.

Intellectual quality: Deep knowledge (Does the lesson cover operational fields in any depth, detail or level of specificity?), Knowledge problematic (Are students critically examining texts, ideas and knowledge?), Metalanguage (Are aspects of language, grammar and technical vocabulary being given prominence?).

Supportive classroom environment: Student control (Do students determine specific activities or outcomes of the lesson?), Engagement (Are students engaged and on-task during the lesson?), and Self-regulation (Is the direction of student behavior implicit and self-regulatory?).

4.3) Outcome: elevated student's academic achievement

5. Implementation of teacher development model

The researcher developed Acct teacher development model for private school out of field teacher so that they can teach effectively and able to raise student's achievement. School administrator should study teacher development model main characteristics and imply the model according to your schools context. These are steps in implementing ACCT teacher development model:

1) School administrators must realize and see the importance of out of field teacher and participate in the development of out of field teacher to raise student's academic achievement.

2) School administrators and teachers must decide and agree on the approaches and development models that most suitable to the development topics.

3) School administrators and teachers make a decision on the approaches and development models that best suit their school context.

4) School administrators and teachers make a decision on knowledge to develop for out of field teacher that able to bring out student's achievement.

5) Teachers must participant in the exchange of knowledge on technological pedagogical content knowledge and productive pedagogies.

6) School administrators' role is to learn and be a mediator in the development process and support each teacher.

7) Educational personnel in school should participate in the development in order to understand the needs of out of filed teacher and better support them.

8) Schools need to have grading system that able to track each students and able to reflect the information of success factors to out of field teachers and share the gained knowledge to public.

6. Measurement and evaluation of teacher development model

6.1 Measure and evaluate teacher's satisfaction towards approaches and development by using satisfaction form.

6.2 Measure and evaluate teacher's knowledge on TPACK by using opened test.

6.3 Measure and evaluate teacher's knowledge on productive pedagogies by checking through lesson plan and apply micro teaching approach.

6.4 Measure and evaluate student's academic achievement by comparing national test.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

แบบประเมินความเหมาะสมและความเป็นไปได้ของร่างรูปแบบการพัฒนาครูโรงเรียนเอกชน"แอคโมเดล"(ACCT Teacher Development Model)

คำชี้แจง

1 .แบบประเมินนี้มีวัตถุประสงค์เพื่อประเมินความเหมาะสมและความเป็นไปได้ของร่างรูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ และทำการประเมินโดยผู้ทรงคุณวุฒิเป็นรายบุคคล

2 .เอกสารประกอบข้อมูลวิจัย ครั้งนี้ แบ่งออกเป็น 2 ชุด ได้แก่

เอกสารชุดที่ 1 แบบประเมินความเหมาะสมและความเป็นไปได้ของร่างรูปแบบการพัฒนาครูโรงเรียนเอกชน "แอคโมเดล"(ACCT Teacher Development Model) (ฉบับท มี 2 ตอน

ตอนที่ 1 ข้อมูลส่วนบุคคลของผู้ตอบแบบประเมิน

ตอนที่ 2ความคิดเห็นเกี่ยวกับความเหมาะสมของการกำหนดองค์ประกอบ (ร่าง) รูปแบบการพัฒนาครูโรงเรียนเอกชน"แอค โมเดล" (ACCT Teacher Development Model)

ตอนที่ 3 ความคิดเห็นเกี่ยวกับความเหมาะสมและความเป็นไปได้ของร่างรูปแบบการพัฒนาครูโรงเรียนเอกชน"แอคโมเดล" (ACCT Teacher Development Model) โดยใช้แบบมาตราส่วนประมาณค่า)Rating scaleและข้อเสนอแนะ (เพิ่มเติมปลายเปิด

ตอนที่ 4 ความคิดเห็นเกี่ยวกับความเหมาะสมและความเป็นไปได้ของแผนภาพ

เอกสารชุดที่ 2 ที่มาของร่างรูปแบบการพัฒนาครูโรงเรียนเอกชน"แอคโมเดล" (ACCT Teacher Development Model) สำหรับใช้ประกอบเป็นฐานข้อมูลเพื่อประเมินในเอกสารชุดที่ 1

3ขอความกรุณาโปรดพิจารณา .ร่างรูปแบบการพัฒนาครูโรงเรียนเอกชน"แอคโมเดล" (ACCT Teacher Development Model) ที่ส่งมาพร้อมกับแบบประเมินนี้แล้วตอบแบบประเมินแต่ละข้อโดยทำเครื่องหมาย ✓ ลงในช่องที่ตรงกับความคิดเห็นของท่าน

4ในการตอบแบบประเมินครั้งนี้ ผู้วิจัยตระหนักดีว่าท่านมีภารกิจที่ต้องปฏิบัติจำนวนมาก แต่ความ . คิดเห็นของท่านเป็นสิ่งที่มีคุณค่าและสำคัญต่อการวิจัย เพื่อผู้วิจัยสามารถนำข้อมูลไปใช้ให้เกิดประโยชน์สูงสุดต่อการพัฒนาครูของประเทศให้มีคุณภาพและประสิทธิภาพมากยิ่งขึ้นต่อไป และขอขอบพระคุณเป็นอย่างสูงมา ณ โอกาสนี้

5 ขอความกรุณาให้ความอนุเคราะห์ส่งแบบประเมินกลับคืนผู้วิจัย .**ภายในวันพฤหัส ที่ 20 สิงหาคม พ.ศ.2563**

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เพื่อทำแบบประเมิน

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ตอนที่ 1 ข้อมูลส่วนบุคคลของผู้ตอบแบบประเมิน

1. ชื่อ ..... นามสกุล .....

2. วุฒิการศึกษาสูงสุด ❑ ปริญญาโท ❑ ปริญญาเอก

3. สำเร็จการศึกษาในสาขาวิชา .....

4. ตำแหน่งปัจจุบัน .....

5. สังกัดที่ทำงาน.....

ตอนที่ ความคิดเห็นเกี่ยวกับความเหมาะสมของการกำหนดองค์ประกอบ (ร่าง) 2รูปแบบการพัฒนาครูโรงเรียนเอกชน) "แอค โมเดล"ACCT Teacher Development Model)

คำชี้แจง กรุณาพิจารณาความเหมาะสมของการกำหนดองค์ประกอบ(ร่าง) รูปแบบฯ โดยใส่ ✓ เครื่องหมายลงในช่องที่ตรงกับความคิดเห็นของท่าน พร้อมทั้งเขียนข้อเสนอแนะที่เป็นประโยชน์ในการพิจารณาปรับปรุงต่อไป

องค์ประกอบของ (ร่าง) รูปแบบการพัฒนาครูโรงเรียนเอกชน "แอค โมเดล" (ACCT Teacher Development Model)	เหมาะสม	ควรปรับปรุง	ไม่เหมาะสม	ข้อเสนอแนะ	
1. ชื่อรูปแบบภาษาไทย					
2. ชื่อรูปแบบภาษาอังกฤษ					
3. ความสำคัญและความเป็นมาของรูปแบบ					
4. วัตถุประสงค์ของรูปแบบ					
5. ลักษณะสำคัญของรูปแบบ					
6. วิธีการนำรูปแบบไปใช้					
7. การวัดผลและประเมินผลการใช้รูปแบบ					

ข้อเสนอแนะอื่นๆ.....

.....

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คำชี้แจงสำหรับตอนที่ 3 ความคิดเห็นเกี่ยวกับความเหมาะสมและความเป็นไปได้ของ (ร่าง) รูปแบบการพัฒนาครูโรงเรียนเอกชน“แอคโมเดล) ”ACCT Teacher Development Model) แบบภาพรวมและรายข้อ โดยใช้แบบประเมินมาตราส่วน ระดับ 5(Rating scale) และคำถามปลายเปิด

คำชี้แจง แบบประเมินนี้เป็นแบบมาตราส่วนประมาณค่า)Rating Scale (5 ระดับ โปรดทำเครื่องหมาย √ ในช่อง **<u>ความเหมาะสม</u>**และ**<u>ความเป็นไปได้</u>**ที่ตรงกับความคิดเห็นของท่านมากที่สุด พร้อมทั้งเขียนข้อเสนอแนะที่เป็นประโยชน์ในการนำไปพิจารณาปรับปรุงต่อไป

ความเหมาะสม		**ความเป็นไปได้**	
ระดับ	หมายถึง	**ระดับ**	**หมายถึง**
5	มีความเหมาะสมของเนื้อหามากและมีความจำเป็นเร่งด่วนใรการปฏิบัติ	5	มีความเป็นไปได้ในการนำไปปฏิบัติสามารถนำไปปฏิบัติได้จริงจนประสบความสำเร็จ
4	มีความเหมาะสมของเนื้อหาค่อนข้างมากและควรนำไปปฏิบัติให้เกิดความสำเร็จ	4	มีความเป็นไปได้ในการนำไปปฏิบัติ มีความเป็นไปได้ในการนำไปปฏิบัติจนประสบความสำเร็จ
3	มีความเหมาะสมของเนื้อหาปานกลาง ปฏิบัติได้ก็ดีไม่ปฏิบัติก็ไม่เกิดความเสียหาย	3	มีความเป็นไปได้ในการนำไปปฏิบัติพอสมควร มีความเป็นไปได้ในการนำไปปฏิบัติจนประสบความสำเร็จในระดับปานกลาง
2	มีความเหมาะสมของเนื้อหาค่อนข้างน้อย นำไปปฏิบัติได้ตามสถานการณ์	2	มีความเป็นไปได้ในการนำไปปฏิบัติพอสมควร แต่มีความยากลำบากในการนำไปปฏิบัติ
1	มีความเหมาะสมของเนื้อหาน้อย อาจไม่คุ้มค่าในการนำไปปฏิบัติ	1	ความเป็นได้ในการปฏิบัติไม่ชัดเจน เมื่อนำไปปฏิบัติอาจจะไม่ประสบความสำเร็จ

ค่าระดับคะแนนในช่อง“ความเหมาะสม”

ระดับคะแนน 5 หมายถึง ความเหมาะสมของเนื้อหาอยู่ในระดับ **มากที่สุด**
ระดับคะแนน 4 หมายถึง ความเหมาะสมของเนื้อหาอยู่ในระดับ **มาก**
ระดับคะแนน 3 หมายถึง ความเหมาะสมของเนื้อหาอยู่ในระดับ **ปานกลาง**
ระดับคะแนน 2 หมายถึง ความเหมาะสมของเนื้อหาอยู่ในระดับ **น้อย**
ระดับคะแนน 1 หมายถึง ความเหมาะสมของเนื้อหาอยู่ในระดับ **น้อยที่สุด**

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ค่าระดับคะแนนในช่อง“ความเป็นไปได้”

ระดับคะแนน 5 หมายถึง ความเป็นไปได้ในการนำไปปฏิบัติอยู่ในระดับ **มากที่สุด**
ระดับคะแนน 4 หมายถึง ความเป็นไปได้ในการนำไปปฏิบัติอยู่ในระดับ **มาก**
ระดับคะแนน 3 หมายถึง ความเป็นไปได้ในการนำไปปฏิบัติอยู่ในระดับ **ปานกลาง**
ระดับคะแนน 2 หมายถึง ความเป็นไปได้ในการนำไปปฏิบัติอยู่ในระดับ **น้อย**
ระดับคะแนน 1 หมายถึง ความเป็นไปได้ในการนำไปปฏิบัติอยู่ในระดับ **น้อยที่สุด**

ตัวอย่างการตอบแบบสอบถาม

(ร่าง) รูปแบบการพัฒนาครูโรงเรียนเอกชน “แอค โมเดล” (ACCT Teacher Development Model)	ความเหมาะสม					ความเป็นไปได้					ข้อเสนอแนะ
	5	4	3	2	1	5	4	3	2	1	
ลักษณะสำคัญของการพัฒนาครู											
1) การพัฒนาครูโดยการเปลี่ยนแปลงด้วย รูปแบบการวิจัยเชิงปฏิบัติการ		✓					✓				

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ตอนที่ ความคิดเห็นเกี่ยวกับความเหมาะสมและความเป็นไปได้ของ (ร่าง) รูปแบบการพัฒนา 3 "ครูโรงเรียนเอกชน "แอคโมเดล(ACCT Teacher Development Model)

(ร่าง) รูปแบบการพัฒนาครูโรงเรียนเอกชน "แอค โมเดล" (ACCT Teacher Development Model)	ความเหมาะสม					ความเป็นไปได้					ข้อเสนอแนะ
	5	4	3	2	1	5	4	3	2	1	
ลักษณะสำคัญของการพัฒนาครู											
1. การพัฒนาครูโดยการเปลี่ยนแปลงด้วย รูปแบบการวิจัยเชิงปฏิบัติการ											
2. การพัฒนาครูโดยการเปลี่ยนแปลงด้วยรูปแบบการเปลี่ยนแปลง											
3. การพัฒนาครูโดยการส่งผ่านด้วยรูปแบบชุมชนนักปฏิบัติ											
4. การพัฒนาครูโดยการส่งผ่านด้วยรูปแบบโค้ชและพี่เลี้ยง											
ด้านองค์ความรู้ของครู:ความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา (TPACK)											
1. ด้านความรู้บูรณาการในด้านเทคโนโลยี ศาสตร์การสอนและเนื้อหา (TPACK)											
2. ด้านความรู้บูรณาการในด้านเทคโนโลยีและศาสตร์การสอน (TPK)											
3. ด้านความรู้บูรณาการในด้านเทคโนโลยีและเนื้อหา (TCK)											
4. ด้านความรู้บูรณาการในด้านศาสตร์การสอนและเนื้อหา (PCK)											

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(ร่าง) รูปแบบการพัฒนาครูโรงเรียนเอกชน “แอค โมเดล” (ACCT Teacher Development Model)	ความเหมาะสม					ความเป็นไปได้					ข้อเสนอแนะ
	5	4	3	2	1	5	4	3	2	1	
ด้านองค์ความรู้ด้านการสอนของครู: ศาสตร์การสอนที่มีผลิตภาพ											
ด้านคุณภาพทางปัญญา (Intellectual Quality)											
1. การพินิจพิเคราะห์แง่มุมของภาษา วลีและคำศัพท์อย่างลึกซึ้ง (Metalanguage)											
2. ความรู้เชิงลึก (Deep Knowledge)											
3. ความรู้ที่เป็นปัญหา (Knowledge Problematic)											
ด้านสภาพแวดล้อมห้องเรียนที่เอื้อต่อการเรียนรู้ (Supportive Classroom Environment)											
1. การกำกับตนเอง (Self-Regulation)											
2. การมีส่วนร่วมทางวิชาการอย่างลึกซึ้ง (Engagement)											
3. นักเรียนมีส่วนร่วมในการกำหนดการเรียนรู้ (Student Control)											

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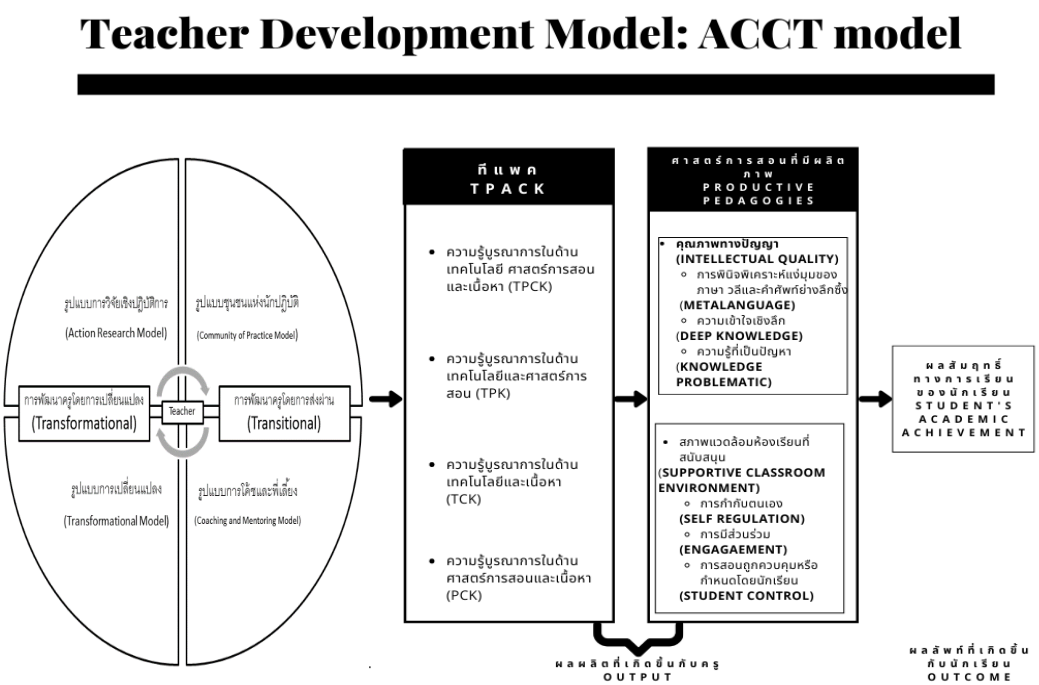
ตอนที่ 4 ความคิดเห็นเกี่ยวกับความเหมาะสมและความเป็นไปได้ของแผนภาพ



☐☐เหมาะสม

☐☐ควรปรับปรุง

☐☐ไม่เหมาะสม

ความคิดเห็น/ข้อเสนอแนะเพิ่มเติม

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ขอกราบขอบพระคุณในความกรุณาของท่านที่สละเวลาอันมีค่าเพื่อตอบแบบประเมินความเหมาะสมและความเป็นไปได้ของรูปแบบการพัฒนาครูนี้

ลงชื่อ.....

(.....)

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APPENDIX C

LIST OF EXPERTS

1) List of Experts that Verified Conceptual Framework and Research Questionnaires

2) List of Experts that Verified the Appropriateness and Feasibility of Teacher Development Model (1st Draft)

3) List of Experts Participated in the Focus Group

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List of Experts that Verify Conceptual Framework and Research Questionnaires

1. Kaanwarin Polanunt, Ph.D.

   Director of St. Andrews International School Bangkok

2. Associate Professor Boonmee Nenyod, Ph.D.

   Graduate School of Education, Siam University

3. Associate Professor Weerawat Utairat, Ph.D.

   Vice President EASTERN ASIA UNIVERSITY

4. Associate Professor Montree Yamkasikorn, Ph.D.

   Superintendent International School Eastern Seaboard

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List of Experts that verified the appropriateness and feasibility of teacher development model (1st draft)

Experts in Educational Management

1. Thapanat Udomsri, Ph.D.
   Academic Education Expertise, Bureau of Educational Innovation Development
2. Saadlak Chongklai Klang Ph.D.
   Secretariat of the Educational Council, Ministry of Education
3. Artip SornSujitra Ph.D.
   Education Development, St.Grabriel's Foundation Network
4. Kanokwan Chuchuep, Ph.D.
   Education Development, Office of the Civil Service Commission (OCSC)
5. Wuttisak Lekkham, Ph.D.
   Director of the Office of Special Education Administration, Ministry of Education
6. Nipaporn Chalermnirundorn, Ph.D.
   Director of Master of Education Program, Rangsit University

Experts in Teacher Development

1. Associate Professor Dr. Chularat Thamprateep, Ph.D.
   Department of Education, Sukhothai Thammathirat Open University
2. Assistant Professor Pratumthong Trairat, Ph.D.
   Director of Master of Education, Rangsit University
3. Associate Professor Montree Yamkasikorn, Ph.D.
   Superintendent International School Eastern Seaboard
4. Associate Professor Siriphan Suwanmakha, Ph.D.
   Center for the Advancement of Learning and Teaching Profession, Faculty of Education, Chulalongkorn University

Expert in School Administration

1. Mrs. Supalak Chaisathan
   School Director, Wattana Wittaya Academy
2. Supakit Jitsaklongsap, Ph.D.
   School Director, Bangkok Christian College
3. Wittaya Phatthanawong, Ph.D.
   School Director, Aroonpradit School Petchaburi
4. Associate Professor Ladda Pukiat
   School Director, Satit Pattana School
5. Phatcharee Sapthaweeporn, Ph.D.
   School Principle, Prasanmit School: New Concept School NLP
6. Pathan Senivong Na Ayudhya, Ph.D.
   School Director, Fueng Fah Wittaya School
7. Natthinee Piethong, Ph.D.
   School Manager and Director,Triumbundhit School

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Experts in Pedagogies

1. Marut Tasanagorakool,
   Seed Education Educational Consultant
2. Associate Professor Nonthalee Prontadavit, Ph.D.
   Faculty of Industrial Education, Rajamangala University of Technology Thanyaburi
3. Santi Kitluekiet, Ph.D.
   School Manager, Wipharat School
4. Associate Professor Kanchana Chanprasert, Ph.D.
   Director of Physics Program, Rangsit University
5. Assistant Professor Vibhavadi Tubiya
   Lecturer in Business Administration, Faculty of Management Sciences, Valaya Alongkorn Rajabhat University

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List of Experts Participated in the Focus Group

Experts in Educational Management

1.Thapanat Udomsri, , Ph.D.
Academic Education Expertise, Bureau of Educational Innovation Development

2. Peerasitch Meesomsarn, Ph.D.
Kantawan School Manager

3. Techamet Pianchana, Ph.D.
Faculty of Education, Kasetsart University

Experts in Teacher Development

1. Assistant Professor Pratumthong Trairat, Ph.D.
Director of Master of Education, Rangsit University

2. Associate Professor Montree Yamkasikorn, Ph.D.
Superintendent International School Eastern Seaboard

Expert in School Administration

1. Phatcharee Sapthaweeporn, Ph.D.
School Principal, Prasanmit School

2. Supakit Jitsaklongsap, Ph.D.
School Director, Bangkok Christian College

3. Thanika Jesadawarangkul, Ph.D.
School Director, Banwangthong Leadership School

Experts in Pedagogies

1. Assistant Professor Kantawan Meesomsarn, Ph.D.
School of Education Study, Sukhothai Thammathirat Open University

2. Associate Professor Kanchana Chanprasert, Ph.D.
Director of Physics Program, Rangsit University

3. Nipaporn Chalermnirundorn, Ph.D.
Director of Master of Education Program, Rangsit University

4. Chitchamai Visuttakul, Ph.D.
Faculty of Education, Rangsit University

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APPENDIX D

LETTERS

1) Letter for Experts to Verified Conceptual Framework and Research Questionnaires

2) Letter Requesting to Try Out Research Instrument

3) Letter Seeking for Cooperation to Collect Data

4) Invitation Letter for Experts to Verify the Appropriateness and Feasibility of Teacher Development Model (1st Draft)

5) Invitation Letter for the Focus Group

6) Invitation Letter for Dissertation Committee

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ที่ ศธ 0512.6(2791.10)/60- 6104

คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ถนนพญาไท กรุงเทพมหานคร 10330

พฤศจิกายน 2560

เรื่อง ขอเชิญเป็นผู้ทรงคุณวุฒิตรวจกรอบแนวคิดและเครื่องมือวิจัย

เรียน ดร.กาญจน์วรินทร์ ผลอนันต์

สิ่งที่ส่งมาด้วย กรอบแนวคิดและเครื่องมือที่ใช้ในการวิจัย

ด้วย นายณัฐวุฒิ เกตุไชโย นิสิตหลักสูตรครุศาสตรดุษฎีบัณฑิต สาขาวิชาบริหารการศึกษา ภาควิชานโยบาย การจัดการและความเป็นผู้นำทางการศึกษา อยู่ระหว่างการดำเนินงานวิจัยวิทยานิพนธ์เรื่อง "รูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพลและศาสตร์การสอนที่มีผลิตภาพ" โดยมี ศาสตราจารย์ ดร.พฤทธิ์ ศิริบรรณพิทักษ์ และผู้ช่วยศาสตราจารย์ ดร.นันทรัตน์ เจริญกุล เป็นอาจารย์ที่ปรึกษา ในการนี้จึงขอเชิญท่านเป็นผู้ทรงคุณวุฒิตรวจกรอบแนวคิดและเครื่องมือวิจัย ทั้งนี้นิสิตผู้วิจัยจะได้ประสานงานในรายละเอียดต่อไป

จึงเรียนมาเพื่อขอความอนุเคราะห์จากท่านโปรดเป็นผู้ทรงคุณวุฒิดังกล่าวเพื่อประโยชน์ทางวิชาการต่อไป และขอขอบคุณมาในโอกาสนี้

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์ ดร.อรุณี หงษ์ศิริวัฒน์)
รองคณบดี
ปฏิบัติการแทนคณบดี

กลุ่มภารกิจบริการการศึกษา ฝ่ายสนับสนุนวิชาการ
โทร. 0-2218-2565-97 ต่อ 6732
เบอร์โทรศัพท์ผู้วิจัย: 0870717105 email: nutchaiyo01@gmail.com

ที่ ศธ 0512.6(2791.10)/60- 6103

คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ถนนพญาไท กรุงเทพมหานคร 10330

พฤศจิกายน 2560

เรื่อง ขอเชิญเป็นผู้ทรงคุณวุฒิตรวจกรอบแนวคิดและเครื่องมือวิจัย

เรียน รศ.ดร.บุญมี เณรยอด

สิ่งที่ส่งมาด้วย กรอบแนวคิดและเครื่องมือที่ใช้ในการวิจัย

ด้วย นายณัฐวุฒิ เกตุไชโย นิสิตหลักสูตรครุศาสตรดุษฎีบัณฑิต สาขาวิชาบริหารการศึกษา ภาควิชานโยบาย การจัดการและความเป็นผู้นำทางการศึกษา อยู่ระหว่างการดำเนินงานวิจัยวิทยานิพนธ์เรื่อง "รูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพลและศาสตร์การสอนที่มีผลิตภาพ" โดยมี ศาสตราจารย์ ดร.พฤทธิ์ ศิริบรรณพิทักษ์ และผู้ช่วยศาสตราจารย์ ดร.นันทรัตน์ เจริญกุล เป็นอาจารย์ที่ปรึกษา ในการนี้จึงขอเชิญท่านเป็นผู้ทรงคุณวุฒิตรวจกรอบแนวคิดและเครื่องมือวิจัย ทั้งนี้นิสิตผู้วิจัยจะได้ประสานงานในรายละเอียดต่อไป

จึงเรียนมาเพื่อขอความอนุเคราะห์จากท่านโปรดเป็นผู้ทรงคุณวุฒิดังกล่าวเพื่อประโยชน์ทางวิชาการต่อไป และขอขอบคุณมาในโอกาสนี้

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์ ดร.อรุณี หงษ์ศิริวัฒน์)
รองคณบดี
ปฏิบัติการแทนคณบดี

กลุ่มภารกิจบริการการศึกษา ฝ่ายสนับสนุนวิชาการ
โทร. 0-2218-2565-97 ต่อ 6732
เบอร์โทรศัพท์ผู้วิจัย: 0870717105 email: nutchaiyo01@gmail.com

ที่ ศธ 0512.6(2791.10)/60-6102

คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ถนนพญาไท กรุงเทพมหานคร 10330

พฤศจิกายน 2560

เรื่อง ขอเชิญเป็นผู้ทรงคุณวุฒิตรวจกรอบแนวคิดและเครื่องมือวิจัย

เรียน รศ.ดร.วีระวัฒน์ อุทัยรัตน์

สิ่งที่ส่งมาด้วย กรอบแนวคิดและเครื่องมือที่ใช้ในการวิจัย

ด้วย นายณัฐวุฒิ เกตุไชโย นิสิตหลักสูตรครุศาสตรดุษฎีบัณฑิต สาขาวิชาบริหารการศึกษา ภาควิชานโยบาย การจัดการและความเป็นผู้นำทางการศึกษา อยู่ระหว่างการดำเนินงานวิจัยวิทยานิพนธ์เรื่อง "รูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพลและศาสตร์การสอนที่มีผลิตภาพ" โดยมี ศาสตราจารย์ ดร.พฤทธิ์ ศิริบรรณพิทักษ์ และผู้ช่วยศาสตราจารย์ ดร.นันทรัตน์ เจริญกุล เป็นอาจารย์ที่ปรึกษา ในการนี้จึงขอเชิญท่านเป็นผู้ทรงคุณวุฒิตรวจกรอบแนวคิดและเครื่องมือวิจัย ทั้งนี้นิสิตผู้วิจัยจะได้ประสานงานในรายละเอียดต่อไป

จึงเรียนมาเพื่อขอความอนุเคราะห์จากท่านโปรดเป็นผู้ทรงคุณวุฒิดังกล่าวเพื่อประโยชน์ทางวิชาการต่อไป และขอขอบคุณมาในโอกาสนี้

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์ ดร.อรุณี หงษ์ศิริวัฒน์)
รองคณบดี
ปฏิบัติการแทนคณบดี

กลุ่มภารกิจบริการการศึกษา ฝ่ายสนับสนุนวิชาการ
โทร. 0-2218-2565-97 ต่อ 6732
เบอร์โทรศัพท์ผู้วิจัย: 0870717105 email: nutchaiyo01@gmail.com

ที่ ศธ 0512.6(2791.10)/60-5931

คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ถนนพญาไท กรุงเทพมหานคร 10330

พฤศจิกายน 2560

เรื่อง ขอเชิญเป็นผู้ทรงคุณวุฒิตรวจกรอบแนวคิดและเครื่องมือวิจัย

เรียน รองศาสตราจารย์ ดร.มนตรี แย้มกสิกร

สิ่งที่ส่งมาด้วย กรอบแนวคิดและเครื่องมือที่ใช้ในการวิจัย

ด้วย นายณัฐวุฒิ เกตุไชโย นิสิตหลักสูตรครุศาสตรดุษฎีบัณฑิต สาขาวิชาบริหารการศึกษา ภาควิชานโยบาย การจัดการและความเป็นผู้นำทางการศึกษา อยู่ระหว่างการดำเนินงานวิจัยวิทยานิพนธ์เรื่อง "รูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพลและศาสตร์การสอนที่มีผลิตภาพ" โดยมี ศาสตราจารย์ ดร. พฤทธิ์ ศิริบรรณพิทักษ์ และผู้ช่วยศาสตราจารย์ ดร.นันทรัตน์ เจริญกุล เป็นอาจารย์ที่ปรึกษา ในการนี้จึงขอเชิญท่านเป็นผู้ทรงคุณวุฒิตรวจกรอบแนวคิดและเครื่องมือวิจัย ทั้งนี้นิสิตผู้วิจัยจะได้ประสานงานในรายละเอียดต่อไป

จึงเรียนมาเพื่อขอความอนุเคราะห์จากท่านโปรดเป็นผู้ทรงคุณวุฒิดังกล่าวเพื่อประโยชน์ทางวิชาการต่อไป และขอขอบคุณมาในโอกาสนี้

ขอแสดงความนับถือ

(รองศาสตราจารย์ ดร.สุมาลี ชิโนกุล)
รองคณบดี
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กลุ่มภารกิจบริการการศึกษา ฝ่ายสนับสนุนวิชาการ
โทร. 0-2218-2565-97 ต่อ 6732
เบอร์โทรศัพท์ผู้วิจัย: 0870717105 email: nutchaiyo01@gmail.com

ที่ ศธ 0512.6(2791.01)/61-

คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ถนนพญาไท กรุงเทพมหานคร 10330

สิงหาคม 2561

เรื่อง ขอทดลองใช้เครื่องมือวิจัย

เรียน ท่านผู้อำนวยการโรงเรียน

สิ่งที่ส่งมาด้วย เครื่องมือที่ใช้ในการวิจัย

ด้วย นายณัฐวุฒิ เกตุไชโย นิสิตหลักสูตรครุศาสตรดุษฎีบัณฑิต สาขาวิชาบริหารการศึกษาภาควิชานโยบาย การจัดการและความเป็นผู้นำทางการศึกษา อยู่ระหว่างการดำเนินงานวิจัยวิทยานิพนธ์เรื่อง "ผู้บริหารและครูโรงเรียนเอกชน สังกัดสำนักงานคณะกรรมการส่งเสริมการศึกษาเอกชน" โดยมีศาสตราจารย์ ดร.พฤทธิ์ ศิริบรรณพิทักษ์ และผู้ช่วยศาสตราจารย์ ดร.นันทรัตน์ เจริญกุล เป็นอาจารย์ที่ปรึกษา ในการนี้นิสิตมีความจำเป็นต้องเก็บข้อมูลด้วยแบบสอบถาม กับท่านผู้บริหารและครูในสังกัดของท่าน ทั้งนี้นิสิตผู้วิจัยจะได้ประสานงานในรายละเอียดต่อไป

จึงเรียนมาเพื่อขอความอนุเคราะห์จากท่านโปรดอนุญาตให้นิสิตได้ทดลองใช้เครื่องมือดังกล่าวเพื่อประโยชน์ทางวิชาการต่อไป และขอขอบคุณมาในโอกาสนี้

ขอแสดงความนับถือ

(รองศาสตราจารย์ ดร.สุมาลี ชีโนกุล)
รองคณบดี
ปฏิบัติการแทนคณบดี

กลุ่มภารกิจบริการการศึกษา ฝ่ายสนับสนุนวิชาการ
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เบอร์โทรศัพท์ผู้วิจัย: 087-071-7105 email: nutchaiyo01@gmail.com

ที่ ศธ 0512.6(2791.01)/61-

คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ถนนพญาไท กรุงเทพมหานคร 10330

กันยายน 2561

เรื่อง ขอความร่วมมือในการเก็บข้อมูลวิจัย

เรียน ท่านผู้อำนวยการโรงเรียน

สิ่งที่ส่งมาด้วย เครื่องมือที่ใช้ในการวิจัย

ด้วย นายณัฐวุฒิ เกตุไชโย นิสิตหลักสูตรครุศาสตรดุษฎีบัณฑิต สาขาวิชาบริหารการศึกษาภาควิชานโยบาย การจัดการและความเป็นผู้นำทางการศึกษา อยู่ระหว่างการดำเนินงานวิจัยวิทยานิพนธ์เรื่อง "รูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ" โดยมีศาสตราจารย์ ดร.พฤทธิ์ ศิริบรรณพิทักษ์ และอาจารย์ ดร.นันทรัตน์ เจริญกุล เป็นอาจารย์ที่ปรึกษา ในการนี้นิสิตมีความจำเป็นต้องเก็บข้อมูลด้วยแบบสอบถาม กับกับท่านผู้บริหารและครูในสังกัดของท่าน ทั้งนี้นิสิตผู้วิจัยจะได้ประสานงานในรายละเอียดต่อไป

จึงเรียนมาเพื่อขอความอนุเคราะห์จากท่านโปรดอนุญาตให้นิสิตได้ทำการเก็บข้อมูลวิจัยดังกล่าว เพื่อประโยชน์ทางวิชาการต่อไป และขอขอบคุณมาในโอกาสนี้

ขอแสดงความนับถือ

(รองศาสตราจารย์ ดร.สุมาลี ชิโนกุล)
รองคณบดี
ปฏิบัติการแทนคณบดี

กลุ่มภารกิจบริการการศึกษา ฝ่ายสนับสนุนวิชาการ
โทร.0-2218-2565-97 ต่อ 6732
เบอร์โทรศัพท์ผู้วิจัย: 087 – 071-7105 email: nutchaiyo01@gmail.com

ที่ อว 64.6/2522

คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ถนนพญาไท กรุงเทพมหานคร 10330

4 สิงหาคม 2563

เรื่อง ขอเชิญเป็นผู้ทรงคุณวุฒิตรวจความเหมาะสมและความเป็นไปได้ของรูปแบบ

เรียน รองศาสตราจารย์ ลัดดา ภู่เกียรติ

สิ่งที่ส่งมาด้วย แบบประเมินความเหมาะสมและความเป็นไปได้ของรูปแบบ

ด้วย นายณัฐวุฒิ เกตุไชโย นิสิตหลักสูตรครุศาสตรดุษฎีบัณฑิต สาขาวิชาบริหารการศึกษา ภาควิชานโยบายการจัดการและความเป็นผู้นำทางการศึกษา คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย อยู่ระหว่างการดำเนินงานวิจัยวิทยานิพนธ์เรื่อง “รูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ” โดยมีศาสตราจารย์ ดร.พฤทธิ์ ศิริบรรณพิทักษ์ และผู้ช่วยศาสตราจารย์ ดร.นันทรัตน์ เจริญกุล เป็นอาจารย์ที่ปรึกษา

ในการนี้จึงขอเชิญท่านเป็นผู้ทรงคุณวุฒิตรวจสอบประเมินความเหมาะสมและความเป็นไปได้ของรูปแบบ ทั้งนี้นิสิตผู้วิจัยจะได้ประสานงานในรายละเอียดต่อไป

จึงเรียนมาเพื่อขอความอนุเคราะห์จากท่านโปรดเป็นผู้ทรงคุณวุฒิดังกล่าว เพื่อประโยชน์ทางวิชาการต่อไป และขอขอบคุณมาในโอกาสนี้

ขอแสดงความนับถือ

(รองศาสตราจารย์ ดร.สุมาลี ชิโนกุล)
รองคณบดี
ปฏิบัติการแทนคณบดี

กลุ่มภารกิจบริการการศึกษาระดับบัณฑิตศึกษาและวิรัชกิจ ฝ่ายวิชาการ
โทร. 0-2218-2565 ต่อ 6734
เบอร์โทรศัพท์ผู้วิจัย: 087-0717105 email: nutchaiyo01@gmail.com

ที่ อว 64.6/2980

คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ถนนพญาไท กรุงเทพมหานคร 10330

26 สิงหาคม 2563

เรื่อง ขอเชิญบุคลากรในสังกัดเป็นผู้ทรงคุณวุฒิเข้าร่วมประชุมกลุ่ม (Focus Group)

เรียน รองศาสตราจารย์ ดร.มนตรี แย้มกสิกร

สิ่งที่ส่งมาด้วย เครื่องมือที่ใช้ในการวิจัย

ด้วยนายณัฐวุฒิ เกตุไชโย นิสิตหลักสูตรครุศาสตรดุษฎีบัณฑิต สาขาวิชาบริหารการศึกษา ภาควิชานโยบายการจัดการและความเป็นผู้นำทางการศึกษา อยู่ระหว่างการดำเนินงานวิจัยวิทยานิพนธ์เรื่อง “รูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ” โดยมี ศาสตราจารย์ ดร.พฤทธิ์ ศิริบรรณพิทักษ์ และ ผู้ช่วยศาสตราจารย์ ดร.นันทรัตน์ เจริญกุล เป็นอาจารย์ที่ปรึกษา

ในการนี้จึงขอเชิญท่านเข้าร่วมประชุมกลุ่ม (Focus Group) ในวันพฤหัสบดีที่ 27 สิงหาคม 2563 เวลา 13.00 น. ณ ห้องประชุมโรงเรียนนภสร ทั้งนี้นิสิตผู้วิจัยจะได้ประสานงานในรายละเอียดต่อไป

จึงเรียนมาเพื่อขอเชิญท่านเข้าร่วมประชุมกลุ่ม (Focus Group) ในวันเวลาดังกล่าว เพื่อประโยชน์ทางวิชาการต่อไป และขอขอบคุณมาในโอกาสนี้

ขอแสดงความนับถือ

(รองศาสตราจารย์ ดร.สุมาลี ชิโนกุล)
รองคณบดี
ปฏิบัติการแทนคณบดี

กลุ่มภารกิจบริการการศึกษาระดับบัณฑิตศึกษาและวิรัชกิจ ฝ่ายวิชาการ
โทร. 0-2218-2565 ต่อ 6734
เบอร์โทรศัพท์ผู้วิจัย: 087-0717105 email: nutchaiyo01@gmail.com

ที่ อว 64.6/2755

คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ถนนพญาไท กรุงเทพมหานคร 10330

14 สิงหาคม 2563

เรื่อง ขอเชิญเป็นกรรมการสอบวิทยานิพนธ์

เรียน ดร.สมศักดิ์ ดลประสิทธิ์

ตามที่ คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย ได้แต่งตั้งกรรมการสอบวิทยานิพนธ์ของ นายณัฐวุฒิ เกตุไชโย เลขประจำตัวนิสิต 578 44827 27 นิสิตหลักสูตรครุศาสตรดุษฎีบัณฑิต สาขาวิชาบริหารการศึกษา ภาควิชานโยบายการจัดการและความเป็นผู้นำทางการศึกษา ได้ทำวิทยานิพนธ์เรื่อง “รูปแบบการพัฒนาครูโรงเรียนเอกชนตามแนวคิดทีแพคและศาสตร์การสอนที่มีผลิตภาพ” (PRIVATE SCHOOL TEACHER DEVELOPMENT MODEL BASED ON THE CONCEPTS OF TPACK AND PRODUCTIVE PEDAGOGIES) นั้น

บัดนี้ได้กำหนดวันสอบวิทยานิพนธ์ในเรื่องดังกล่าวข้างต้น ในวันที่ 14 กันยายน 2563 เวลา 17.00 น. ณ ห้อง 704 ชั้น 7 อาคารพระมิ่งขวัญการศึกษาไทย คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

จึงเรียนมาเพื่อขอเชิญท่านเป็นกรรมการสอบให้กับ นายณัฐวุฒิ เกตุไชโย ตามวันเวลาดังกล่าวด้วย จะขอบคุณยิ่ง

ขอแสดงความนับถือ

(รองศาสตราจารย์ ดร.สุมาลี ชิโนกุล)
รองคณบดี
ปฏิบัติการแทนคณบดี

กลุ่มภารกิจบริการการศึกษาระดับบัณฑิตศึกษาและวิรัชกิจ ฝ่ายวิชาการ
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VITA

NAME	Natthawut Katechaiyo
DATE OF BIRTH	26th June 1988
PLACE OF BIRTH	Bangkok, Thailand
INSTITUTIONS ATTENDED	PURSUING DOCTOR OF PHILOSOPHY: October 2014- Present Chulalongkorn University, Bangkok – Educational Policy, Management, and Leadership: Educational Administration MASTER OF EDUCATION: May 2011 – May 2013 Chulalongkorn University, Bangkok – International Program: Curriculum and Instruction in Teaching English as a Foreign Language (TEFL) Completed and published the master project on "A Study of Techniques in Teaching Culture among English as a Foreign Language Teachers at Upper Elementary Education Level"- OJED, Vol.8, No.1, 2013, pp. 2779-2792 BACHELOR OF COMMERCE: March 2007 – March 2010 University of Canterbury, New Zealand – Major: Human Resource Development SECONDARY EDUCATION: March 2003 – December 2006 Christchurch Boy's High School, New Zealand: NCEA Level 1-3
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