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### **Pedagogical content knowledge and expertise in ELT\***

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#### **Abstract**

In an attempt to shed light on how expert teachers of English language are distinguished from non-experts, the present research explored how pedagogical content knowledge, as a characteristic of experts relates to four other dimensions of expertise in ELT. These include teacher's experience, cognitive skills, professional development and learner-centered teaching. To this aim, a questionnaire was developed based on the related literature, comprising 109 items, 41 of which enquired about pedagogical content knowledge and the rest about the other dimensions of expertise in ELT. The reliability and validity of the test were confirmed. The SEM analysis results showed that pedagogical content knowledge was positively and significantly correlated with teacher's experience, cognitive skills and learner-centered teaching. It also showed to have a statistically significant causal relationship with professional development. The findings proved the significance of pedagogical content knowledge as a prominent feature of expertise in ELT, which requires attention to teacher's lesson planning, class management, problem solving, learning assessment/feedback and task design in teacher education programs or teacher evaluation program especially for the sake of teacher professional development.

**Keywords:** pedagogical content knowledge, expertise, teacher expertise, ELT.

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### **Introduction**

Within the field of English language teaching (ELT), teacher expertise is still an under-researched topic (Farrell, 2013). This is a very important focus of ELT research because it can contribute to our general understanding on how English language teachers develop, especially as we consider what distinguishes expert ESL teachers from others who are still developing.

Expertise in ELT has been approached from several aspects and an interesting question raised has been expert teacher's knowledge (Richards, 2011). Shulman argues, for teachers to be effective, knowledge-based competency must lie within three domains that include content knowledge, pedagogical content knowledge and pedagogical knowledge. He defines content knowledge as an understanding of the concepts embedded within the domain being taught. Pedagogical content knowledge is defined as the ability to convey one's understandings of the content knowledge through multiple models of teaching for student understanding, comprehension and achievement. Pedagogical knowledge, as referred to by Shulman, includes the skills necessary for classroom guidance, including management techniques, effective communication strategies and the assessment of student learning (As cited in Hogan & Rabinowitz, 2003).

Richards (2011) distinguished between disciplinary knowledge and pedagogical content knowledge. The latter he considered to be essential in effective language teaching. He defined pedagogical content knowledge as the knowledge that provides a basis for language teaching. It is knowledge that is drawn from the study of language teaching and language learning itself and which can be applied in different ways to the resolution of practical issues in language teaching. It could include course work in areas such as curriculum planning, assessment, reflective teaching, classroom management, teaching children, teaching the four skills, and so on.

Hattie (2003) also took side with pedagogical content knowledge as a facet of expertise gem-stone rather than content knowledge. As

content knowledge is necessary for both experienced and expert teachers, it is not a distinguishing characteristic of experts. Pedagogical content knowledge shows to be a more distinctive feature. In other words, the way knowledge is used in teaching situations is of a great significance to distinguish expert and non-expert teachers.

According to Richards (2011), an acceptable level of relevant pedagogical content knowledge should prepare teachers to be able to understand learners' needs, diagnose learners' learning problems, plan suitable instructional goals for lessons, select and design learning tasks, evaluate students' learning, design and adapt tests, evaluate and choose published materials, adapt commercial materials, make use of authentic materials, make appropriate use of technology and evaluate their own lessons.

How expert teachers' pedagogical content knowledge on its different dimensions relates to the other aspects of expertise such as experience, professional development, cognitive skills and so on is a potential area for research in education in general and ELT in particular. Relevant findings can have effective implications for teacher education, development and professionalism in ELT. Thus, the present study aims to explore this interrelationship and potential effect. The following research questions is formulated:

RQ: How does teacher's pedagogical content knowledge relate to other aspects of expertise in ELT?

To answer this question, the correlation of the main variable, pedagogical content knowledge, and its five dimensions including learning assessment and feedback, problem-solving, lesson planning, task design and class management is tested statistically with four other dimensions of expertise in ELT including experience, cognitive skills, professional development and learner-centered teaching (taken from a conceptual model of teacher expertise in ELT by Yazdanmehr, Akbari, Kiany & Ghaffarsamar, 2016).

### **Review of the related literature**

Literature on expertise in pedagogy (e.g., Berliner, 1994a, 1994b; Shulman, 1987) aimed to specify expert classroom performance as consisting of a number of prototypic features and created unique measures to assess each. For example, Bond, Smith, Baker & Hattie (2000) asserted that an expert teacher (like other experts) has extensive and accessible knowledge. Applied to teachers, this would be knowledge about classrooms, subject matter, and classroom context. Trained observers and analysts assessed this feature of expertise by analyzing and quantitatively coding teachers' classroom lessons and transcripts derived from interviews with teachers.

As part of pedagogical content knowledge, Mishra and Koehler (2006) explored the significance of technological pedagogical content knowledge which is the ability of incorporating and integrating technology in one's teaching. As further explained by Reinders (2009), this kind of pedagogical content knowledge depends on teacher's level of technological expertise and can involve both the ability of using the technology and creating materials and activities using that technology as well as the ability of teaching with that technology.

Yazdanmehr, et al. (2016) reviewed the existing literature on expertise in education in general and ELT in particular and conducted interviews with a panel of experts in ELT (including teacher educators, TEFL university professors, etc.) and proposed a conceptual model of expertise in ELT in which pedagogical content knowledge was one dimension interacting with such other dimensions as cognitive skills, experience, learner-centered teaching and professional development. The interrelationship among dimensions was hypothesized in the light of the literature reviewed and the interviews conducted. Pedagogical content knowledge (PCK) was identified on five sub-scales including learning assessment and feedback (PCK1), problem-solving (PCK2), lesson planning (PCK3), task design (PCK4) and task management (PCK5).

Learning assessment and feedback (PCK1) was ratified as a key dimension of pedagogical content knowledge identifying experts in a

body of research by Moallem (1998), Mishra and Koehler (2006), Oster-Levinz and Klieger (2010), Richards (2011), Meyer (2003), Hogan and Rabinowitz (2003, 2009), Farrell (2013), Meyer (2003), Borg (2006), Hattie (2003) and Johnston (2009).

Continuous and effective problem-solving (PCK2) was recognized as a prominent dimension of an expert teacher's pedagogical content knowledge by Hattie (2003), Hogan and Rabinowitz (2003, 2009), Webb, Diana, Luft, Brooks and Brennan (1997), Richards (2011), Glaser and Chi (1988), Hardre and Chen (2005) and Berliner (2004).

Lesson planning (PCK3) was pointed out as an effective aspects of expert teacher's pedagogical content knowledge in a body of research by Sabers, Cushing and Berliner (1991), Moallem (1998), Hogan and Rabinowitz (2003, 2009), NBPTS (2012), Aykel (1997), Bromme (2001), Gruber (2001), Hattie (2003), Berliner (2004), Hardre and Chen (2005), Farrell (2013), Tsui (2003, 2009), Pisova and Janik (2011) and Meyer (2003).

Effective task design (PCK4) was recognized as a key aspect of the pedagogical content knowledge of expert teachers by Meyer (2003), Hogan and Rabinowitz (2003), NBPTS (2012), Moallem (1998), Hattie (2003) and Cellier, Eyrolle and Martin (1997).

Class management (PCK5) was raised as a prominent aspect of expert teachers' pedagogical content knowledge by Colvin, Kame'enui and Sugai (1993), Cellier et al. (1997), Lewis and Sugai (1999), Hattie (2003), Moallem (1998), Hogan and Rabinowitz (2003, 2009), Meyer (2003), Martin, Yin and Mayall (2006) and Anderson, Evertson and Emmer (1979).

The hypothetical interrelationship between pedagogical content knowledge and other dimensions of expertise in ELT is as the following, and has been statistically tested in this research:

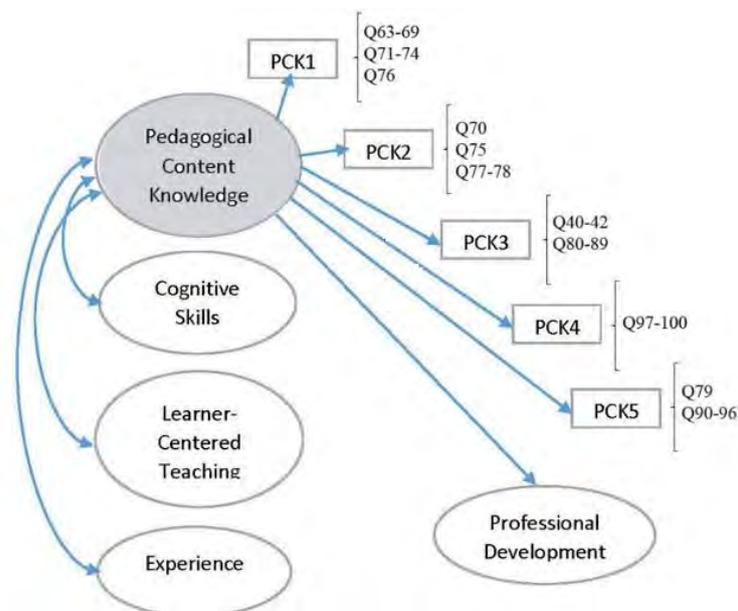


Figure 1: Pedagogical content knowledge and other dimensions of expertise in ELT

In the next section, the Methodology, how this interrelationship was statistically tested is explained and the data analysis procedure is presented too.

## Methodology

### Participants

A total number of 500 English language teachers participated in this study, whose demographic information is summarized in Table 1. They responded to a questionnaire which measured different dimensions of expertise in ELT including pedagogical content knowledge.

Table 1. Research participants' demographic features

Feature	Nationality		Age			Sex		Education		Experience	
	Iranian	Non-Iranian	20-30 yrs.	30-40 yrs.	>40 yrs.	male	female	B.A	MA or +	<5 yrs.	>5 yrs.
n.	390	110	168	222	110	215	285	278	222	200	300
%	78	22	33.6	44.4	22	43	57	55.6	44.4	40	60

### Instrumentation

To collect the required data, a self-rating questionnaire was filled out by participants. The content of the questionnaire was derived from a review of 71 academic books and articles. The questionnaire comprised of 109 items that addressed eight dimensions of expertise including experience, social recognition, pedagogical content knowledge, contextual knowledge, learner-centered knowledge, cognitive skills, professional development and language proficiency. 41 items inquired about teacher's pedagogical content knowledge and the rest rated the other aspects of expertise in ELT. The distribution of these items is presented in Table 2. It is noteworthy that, the present research does not explore the correlation of pedagogical content knowledge with all other dimensions of expertise, but rather tests the hypothetical paths (Figure 1) which have been derived from the literature and interviews, as formulated by Yazdanmehr et al. (2016).

Table 2. Distribution of items enquiring about pedagogical content knowledge

Dimension of Expertise	Code	Subscale	Corresponding items
Experience	Ex	--	Demographic info: hours of teaching experience
Social Recognition	SR	--	Q34-Q35-Q36-Q37- Q38
Cognitive Skills	CS	CS1: Mental power	Q6-Q7-Q8-Q9-Q10- Q11-Q12-Q13-Q14- Q16-Q18
		CS2: Beliefs/values	Q1-Q2-Q3-Q4-Q5- Q15-Q17-Q19
Pedagogical Content Knowledge	PCK	PCK1: Learning assessment and feedback	Q63-Q64-Q65-Q66- Q67-Q68-Q69-Q71- Q72-Q73-Q74-Q76
		PCK2: Problem solving	Q70-Q75-Q77-Q78
		PCK3: Lesson planning	Q40-Q41-Q42-Q80- Q81-Q82-Q83-Q84-

			Q85-Q86-Q87-Q88-Q89
		PCK4: Task design	Q97-Q98-Q99-Q100
		PCK5: Class management	Q79-Q90-Q91-Q92-Q93-Q94-Q95-Q96
Contextual Knowledge	CK	CK1: Structural influences	Q44-Q45-Q46-Q47-Q48
		CK2: Personal influences	Q39-Q43-Q49-Q50
Learner-Centered Teaching	LCT	LCT1: Personalized teaching	Q53-Q56-Q58-Q59-Q60-Q61
		LCT2: Community learning	Q51-Q52-Q54-Q55-Q57-Q62
Language Proficiency	LP	LP1: In comprehension	Q101-Q105-Q109
		LP2: In production	Q102-Q103-Q104-Q106-Q107-Q108
Professional Development	PD	PD1: Self-reflection	Q20-Q21-Q24-Q25
		PD2: Deliberate practice	Q22-Q23-Q26-Q28-Q27-Q29-Q30-Q31-Q32-Q33

Items within the questionnaire are written in the form of brief statements. On the whole, the questionnaire comprises of 3 pages. The instrument begins with a concise introduction to the questionnaire, its structure and how to respond. Respondents are required to fill out personal information including their age, sex, length of experience, academic degree as well as their nationality. The degree to which each statement in each item is true for a respondent is to be rated in a Likert scale. There are four levels: 0, 1, 2, 3 ranging from NOT AT ALL to TO A GREAT EXTENT. Besides the ordinal value, the scores are assumed to have numerical values for subsequent data analysis and interpretation. Therefore, they are all considered as interval data.

#### **Data collection and analysis**

The data collection began in winter 2015 and took 7 months to complete. The questionnaire was emailed to the participants who were mainly contacted through LinkedIn. The completed questionnaires were also received as emails.

To substantiate the construct validity of the scale, a confirmatory factor analysis (CFA) using the SPSS.18.0 statistical package was performed. To test the factorability of the data, Bartlett's test of Sphericity was used along with Kaiser-Meyer-Olkin test. The reliability of the test was checked via Cronbach alpha. SPSS-18 was used to do the analysis.

For the path analysis, Structural Equation Modelling (SEM) tested the hypothetical paths between pedagogical content knowledge and four other dimensions of expertise in ELT, derived from the literature. To this aim, the hypothetical model entered AMOS-18 statistical package.

## Results

### Test reliability and validity

Cronbach's alpha for pedagogical knowledge was estimated at .895 which is interpreted as acceptable and is indicative of a high internal consistency of the items making up this variable. The reliability of the whole questionnaire was also estimated at .950 which is high. The results of Bartlett's test of Sphericity and Kaiser-Meyer-Olkin test can be seen in Table 3.

Table 3. KMO and Bartlett's test results

Kaiser-Meyer-Olkin	Measure of Sampling Adequacy.	.826
Bartlett's Test of Sphericity	Approx. Chi-Square	26942.735
	df	6105

To test the construct validity of the questionnaire, Principal Components Analysis (PCA) was conducted and the results of the Eigen values are presented in the following Figure. These values attest to the suitability of a given item to belong to a factor. All these loadings are above .3 and suitably load on the target construct. Thus, no item discard followed.

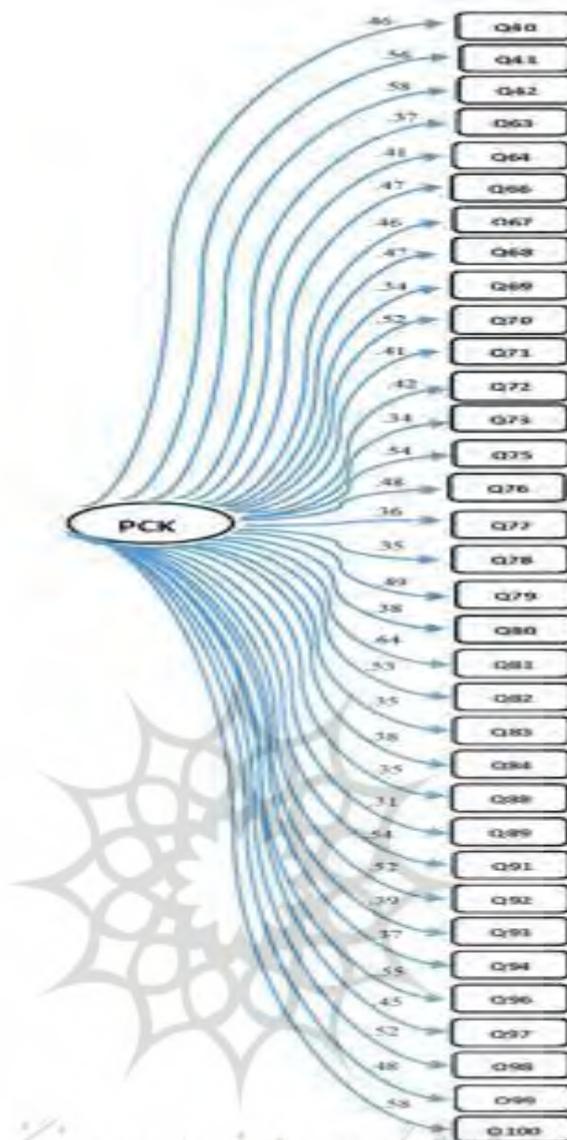


Figure 2: Estimated factor loadings (standardized loadings) of pedagogical content knowledge

**Path analysis**

Table 4 shows the unstandardized estimate, its standard error (abbreviated S.E.), and the estimate divided by the standard error (abbreviated C.R. for Critical Ratio). The probability value is displayed

under the P column. To consider an estimate significant, these levels need to be met:  $S.E. \leq 1$ ,  $CR \geq 1$ ,  $P \leq .05$  (\*\*\*) showing a high significance level). Table 5 shows standardized correlation estimates of the correlational paths within the model. Estimates between .10 and .29 are considered small; those ranging from .30 to .49 are interpreted as medium/moderate; those between .50 and 1.0 are taken as large (Cohen, 1988).

Table 4- Regression weights (unstandardized estimates) in the default model

			Estimate	S.E.	C.R.	P	Label
<b>Professional Development</b>	<---	Pedagogical Content Knowledge	.575	.128	4.479	***	par_23
<b>PCK1</b>	<---	Pedagogical Content Knowledge	.734	.128	4.479	***	
<b>PCK2</b>	<---	Pedagogical Content Knowledge	.385	.025	15.421	***	par_4
<b>PCK3</b>	<---	Pedagogical Content Knowledge	1.145	.068	16.948	***	par_5
<b>PCK4</b>	<---	Pedagogical Content Knowledge	.453	.028	15.968	***	par_6
<b>PCK5</b>	<---	Pedagogical Content Knowledge	.646	.043	15.111	***	par_7

Table 5- Standardized correlation estimates

variables	Estimate
<b>Experience &lt;---&gt; Pedagogical Content Knowledge</b>	<b>.79</b>
<b>Cognitive skills &lt;---&gt; Pedagogical Content Knowledge</b>	<b>.60</b>
<b>Professional development &lt;---&gt; Pedagogical Content Knowledge</b>	<b>.57</b>
<b>Learner-Centered Teaching &lt;---&gt; Pedagogical Content Knowledge</b>	<b>.85</b>

This is better visually represented in Figure 3 which shows the strength of the relations between pedagogical content knowledge and the other target dimensions of expertise in ELT.

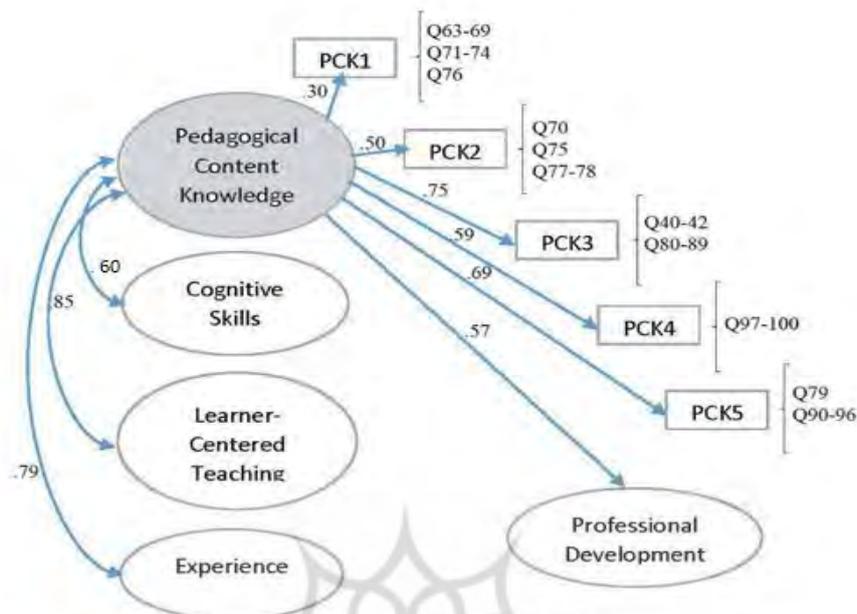


Figure 3. Pedagogical content knowledge and four other dimensions of expertise in ELT

Pedagogical content knowledge was found to be significantly correlated with 3 other dimensions of expertise in ELT including learner-centered teaching, experience and cognitive skills in the order of the strength of correlation. Pedagogical content knowledge was causally related to 1 latent variable, professional development.

Pedagogical content knowledge was significantly related to its own sub-scales: PCK1 (estimate=.73, SE=.128, CR=4.47, p\*\*\*), PCK2 (estimate=.38, SE=.02, CR=15.42, p\*\*\*), PCK3 (estimate=1.14, SE=.06, CR=16.94, p\*\*\*), PCK4 (estimate=.45, SE=.02, CR=15.96, p\*\*\*) and PCK5 (estimate=.64, SE=.04, CR=15.11, p\*\*\*). As standardized estimates in Figure 3 show, the relation between pedagogical content knowledge and its sub-scales follow this order of strength:

<b>PCK→PCK3</b>	(standardized	estimate=.75)	>
<b>PCK→PCK5</b>	(standardized	estimate=.69)	>
<b>PCK→PCK4</b>	(standardized	estimate=.59)	>
<b>PCK→PCK2</b>	(standardized	estimate=.50)	>
<b>PCK→PCK1</b>	(standardized	estimate=.30).	

In other words, the effect of teacher's overall pedagogical content knowledge on his/her lesson planning is stronger than the other aspects of pedagogical content knowledge including class management, task design, pedagogical problem solving and learning assessment.

### Discussion of results

#### **Pedagogical content knowledge and learner-centered teaching**

An expert English language teacher's pedagogical content knowledge is largely correlated with his/her learner-centered teaching ( $r=.85$ ). This finding is approved by Hattie (2003) who maintained an expert teacher's deeper and more sophisticated pedagogical content knowledge is associated with more and more attention to students' role in class and focusing teaching on students' needs, understanding and interests. According to Tsui (2003, 2009), an expert teacher's lesson planning, which is a key aspect of pedagogical content knowledge, goes hand in hand with their ongoing evaluation of learners' needs and interests, not just individual learners but also learners as a group. A similar point was drawn by Farrell (2013) who stated expert teachers' effective lesson plans are accompanied by more focus on their students' needs, interests, abilities and the difficulty level of materials. Expert teachers' lesson plans are fluid and this fluidity also affects students' interests and learning abilities (Farrell, 2013).

How students' diversity affects and is affected by goal modification in task design and lesson plans was also pinpointed by Berliner (2004), (Gruber (2001) and (NBPTS, 2012). Another aspect of pedagogical content knowledge, class management is also correlated with expert teachers' learner centered teaching. As reported by Martin, Yin and Mayall (2006), expert teachers use a lot of group-work in class among learners. Meanwhile, they monitor students and lead a very effective

class management. A key to an effective class management, as maintained by Anderson et al. (1979), is clarification of class rules. Expert teachers do not merely enforce the class rules they set. At the same time, they see it necessary that their students know, understand and value these rules. Therefore, in their efforts to successfully manage their classes, expert teachers spend time clarifying the discrimination between expected and unacceptable class behavior to students (Anderson et al., 1979).

In the light of the present findings, the hypothetical correlation between an expert language teacher's pedagogic content knowledge and learner-centered teaching is accepted. The more attention the teacher pays to students' needs, interests, level and involvement in class, the more successful s/he is in lesson planning, class management, task design/management, pedagogical problem solving and learning assessment (sub-scales of pedagogical content knowledge).

#### **Pedagogical content knowledge and cognitive skills**

An expert English language teacher's pedagogical content knowledge is found to be largely correlated with his/her cognitive skills ( $r=.60$ ). This finding is supported by Tsui (2003, 2009) who described experts' planning thoughts as always integrated and well-organized and maintained this integration and coherence was also manifested in their pedagogical lesson-related decisions or curriculum-based decisions. Expert teachers establish coherence among lessons and try to make links between new lessons and previous ones (Tsui, 2003, 2009). In expert teachers' problem solving, this hand-in-hand effect of cognitive skills and pedagogical content knowledge was also manifest according to Glaser & Chi (1988). These latter scholars report that experts perceive problems differently from novices. Experts see problems at a deeper level and try to analyze pedagogical problems in their analytic mind and then solve them. This is in contrast to the superficial perception of novices (Glaser & Chi, 1988). Teacher's deeper perception and higher analytical skills were, therefore, assumed to be correlated with higher and better ability of problem solving according to Glaser and Chi (1988).

The significant go-togetherness of experts' robust mental ability in organizing knowledge/ideas about a subject and their sophisticated pedagogical problem-solving is also supported by Hogan and Rabinowitz (2009) who did not view this correlation limited to problem-solving. According to these researchers, in lesson planning as well as instructional plans, experts were assumed to be mentally, analytically and creatively active. More effective lesson/instructional plans are associated with expert teachers' analytic and inclusive frame of mind (Hogan & Rabinowitz, 2003).

Overall, the primary hypothetical correlation of an expert English language teacher's pedagogical content knowledge and his/her cognitive skills is accepted due to high statistical significance as well as supports it gets from the literature.

### **Pedagogical content knowledge and professional development**

An expert language teacher's pedagogical content knowledge significantly affects his/her professional development (estimate=.575, SE=.128, CR=4.475, p=\*\*\*). This causal relation can be discussed in the light of a body of other related research. As stated by Moallem (1998), flexible lesson planning (one aspect of pedagogical content knowledge) provides an excellent chance for expert teachers' self-evaluation and improvement (one aspect of professional development). Tsui (2003) draws attention to pedagogical problem solving, another aspect of pedagogical content knowledge, and its effect on an expert teacher's professional development by creating a great chance for teachers' self-reflection and evaluation. According to Hattie (2003), progressive problem solving which expert teachers engage in needs continuous self-monitoring, and through that leads to expert's multiple reflections and self-evaluation to update or further elaborate his/her problem representations as new constraints emerge. This further supports the effect of teacher's pedagogical content knowledge on his/her professional development.

The effect of teacher's pedagogical content knowledge on his/her professional development can also be through class tasks, activities or tests. Mind that task management and test design (for assessing

students' learning) are other aspects of pedagogical content knowledge. According to Moallem (1998), tasks or tests expert teachers design and give students cause them to reflect on their own teaching and make it more efficient.

### **Pedagogical content knowledge and experience**

An expert English language teacher's experience is largely correlated with his/her pedagogical content knowledge' ( $r=.79$ ). This finding is supported by the results of a body of research including Meyer (2003) who observed highly experienced expert teachers whose pedagogical actions and reactions in class seemed to be remarkably intuitive. This effortlessness was similarly acknowledged by Tsui (2003, 2009) in expert teachers' routine class instructions. PISOVA and JANIK (2011) also viewed expert teachers' pedagogical content knowledge as accumulated over extensive periods of practice, which was not only broader than novices but was well-structured and used effectively in class. Dryfus and Dryfus (1988) pointed out expert teachers' faster and deeper (more meaningful) pedagogical problem solving coming along their extensive prior teaching experience. Glaser and Chi (1988) also pinpointed expert teachers' fast instructional problem solving perceived to be correlated with their extensive experience of the job. Higher teaching experience is not only correlated with better pedagogical problem-solving and intuitive pedagogical actions and reactions in class.

Therefore, the hypothetical correlation of an expert teacher's experience and his/her pedagogical content knowledge is accepted as both statistically established and corroborated by the related literature as well as the comments made by ELT practitioners.

### **Conclusions and implications**

In the light of the present findings it can be concluded that pedagogical content knowledge is not only in itself a prominent characteristic of expert English language teachers but also interacts with several other aspects of expertise. A higher pedagogical content knowledge is expected to follow from more experience of teaching. It is also accompanied by more learner-centered teaching as well as better

cognitive skills. Moreover, an expert teacher's pedagogical content knowledge showed to lead to better professional development which comprises of self-reflection and deliberate practice. This can have implications for teacher education programs and as pointed out by Larsen-Freeman and Anderson (2011), language teachers are distinguished from other teachers in general in terms of this distinctive shared pedagogical content knowledge. In teacher education programs, it is recommended to incorporate suggestions on how to effectively plan lessons, manage class, engage in problem solving and develop tasks and have continuous assessment of student learning and provide appropriate feedback, all being the multiple aspects of pedagogical content knowledge.



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