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Using Studio-Based Learning for Enhancing EFL Preservice Teachers' Pedagogical Knowledge and Investigating the Effect on their Pedagogical Content Knowledge

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Abstract
This research utilized a studio-based learning classroom to enhance students/teachers' pedagogical knowledge and investigated the effect of this treatment on their pedagogical content knowledge. Participants of the research were pre-tested and divided into an experimental group (n=38) and a control group (n=38). The research employed a pre/post pedagogical knowledge test and an analytic pedagogical content knowledge rubric. The experiment lasted for 2 months during which the experimental group members were trained in a collaborative studio classroom on classroom management and lesson planning. Traditional lectures on the same topics were delivered to the control group. Upon the completion of the experiment, the participants were post-tested. When statistical analysis was done, it was found that a significant difference existed between the mean scores of the experimental and control groups on the post- administration of both the test and the rubric. Moreover, the proposed studio-based learning classroom was found to be of a large effect size on enhancing the pedagogical knowledge of the targeted topics of the experimental group. So, it was concluded that it had a greater effect size in enhancing the targeted pedagogical knowledge topics for the experimental group than the traditional lecturing for the control group. It seemed also that a positive correlation existed between enhancing students/teachers' pedagogical knowledge and developing their pedagogical content knowledge. So, the research recommended that: (1) As students' pedagogical knowledge and pedagogical content knowledge are not less important than their content knowledge, they should be given more attention in Egyptian EFL faculties of education. (2) Developing EFL prospective teachers' pedagogical knowledge and pedagogical content knowledge via studio-based learning is worthwhile and requires more investigation.
Keywords: Pedagogical knowledge, pedagogical content knowledge, studio-based learning, EFL students/teachers' preparation.

1. Introduction and Background

In the age of knowledge there is a necessity for using our full potentials in learning and teaching English as a Foreign Language (EFL) which has become the universally acknowledged means of knowledge production. EFL teaching is a multifaceted activity; it has several dimensions, and it must rise to the challenge of its enhanced responsibilities: First and foremost, the responsibilities are educational but also social (to teach students to respect people of different cultural backgrounds, for example). EFL teaching is thus a complex endeavour (Kuhlman & Knezevic, 2013). This highlights the importance of the EFL teachers and how far they are equipped for this crucial responsibility towards their society. In spite of this heightened interest in teacher preparation, according to Karimi (2011), still not enough research is done on language teacher cognition and mental life and our understanding of how and why teachers make the decisions they make and what forces are influential in the formation of their professional identity is yet to be completed.

Furthermore, some teachers may regard language teaching as a process of information transmission due to the ineffectual preparation they received. This is affirmed by Zheng (2009, p.76); "several studies suggest that student teachers frequently start professional training with views of teaching as telling and learning as remembering, which poses difficulties when they are encouraged to conduct communicative language teaching." This raises a crucial question: have English teachers preparation programs changed to prepare future teachers to educate English language learners effectively?

O'Neal et al. (2008, p.1) pointed out that "the role of teacher preparation programs has traditionally been to prepare future teachers with content knowledge, understanding of cognitive, psychological, and linguistic development, as well as the current and historic pedagogical theories and methodologies". This was later assured in other words by Eshun & Mensah (2013, p.177) on saying: "knowledge is at the core of teacher education programmes and the foundation of teaching and learning. Teachers' understanding of a subject matter and ability to share information with students comes from the foundations of knowledge they have gained. The knowledge base for teaching defines a set of knowledge necessary to be an effective teacher."

Although teacher knowledge has been a part of professional educators' studies for a long time, it remained undefined. Eventually, in the mid 80s, it has been defined by Shulman (1987). He described a professional

knowledge base for teaching that included seven specific categories of teacher knowledge (Table 1).

Table 1. Teachers' Professional Knowledge Base Categories.

Teacher Knowledge Category	Definition
Subject matter content Knowledge	Academic related knowledge Subject matter knowledge includes information or data and the structures, rules, and conventions for organizing and using information or data.
Pedagogical Content Knowledge	The combination of content and pedagogy Information or data that helps lead learners to an understanding would classify as pedagogical content knowledge. This includes any way of representing a subject that makes it comprehensible to others.
Curriculum Knowledge	Materials and programs that serve as "tools of the trade" for teachers Knowledge of the curriculum can be considered vertical (within a discipline area across grades), or horizontal (within grade and across disciplines).
General Pedagogical Knowledge	Principles of classroom management and organization unrelated to subject matter General pedagogical knowledge is unrelated to a specific subject matter and can therefore be implemented in a vast array of classroom settings.
Knowledge of Learners	Specific understanding of the learners' characteristics These characteristics can be used to specialize and adjust instruction.
Knowledge of Educational Contexts	An understanding of the classroom, the governance and financing of school districts, the character of school communities. Knowledge of the big picture surrounding the classroom helps to inform teachers about how the community may perceive their educational actions. This knowledge of educational contexts may also inform teachers about how to proceed in the classroom in relation to school, community, and state conventions, laws, and rules.
Knowledge of Educational Ends	The purposes and values of education as well as their philosophical and historical grounds An understanding of the purposes and values of education will help teachers motivate learners.

Adopted from Shulman, L. (1987, p.8). Knowledge and teaching: Foundations of the new reform.

As clarified in (Table 1), seven categories of teacher knowledge were defined by Shulman (1987). However, literature about teachers' knowledge has pointed out the importance of developing only three main categories of teachers' knowledge: content knowledge (CK), generic instructional methods or pedagogical knowledge (PK), and pedagogical content knowledge (PCK). This was detected and declared by many researchers such as Cogill (2008) and König & Blomeke (2012). Correspondingly, Rahimi (2008, p.4) stated that language teacher educators have specified the knowledge/competency base of EFL teacher education programs and have proposed a tripartite including:

- knowledge of language: content knowledge, knowledge of the subject matter, English language
- knowledge of science of teaching and pedagogy: pedagogical knowledge, knowledge of generic teaching strategies, beliefs, and practices; along with support knowledge, the knowledge of the various disciplines that would enrich teachers' approach to the teaching and learning of English
- knowledge/competency of teaching in reality: pedagogical content knowledge, the specialized knowledge of how to represent content knowledge in the classroom and how students come to understand the subject matter in the context of real teaching; the students' problems and ways to overcome those problems by considering all variables related to their learning (teaching materials, assessment procedures, parents, etc.)

Some researchers believed that these three categories are interrelated to each other to guarantee teachers' effective transformation of knowledge to learners (Ozden, 2008; Liu, 2013). But how these categories are incorporated or correlated with each others is still a question that necessitates empirical research. In this respect, for the best of the knowledge of the researchers of the present study, very small number of studies attempted to investigate this assumed correlation among these categories; (Lee, 2002; French, 2005; Ozden, 2008). Accordingly, investigating this correlation, if any, has become one of the aims of the current research.

In the last two decades, a great deal of research has been conducted to explore pedagogical knowledge and

pedagogical content knowledge in general education, mathematics, science, second /foreign language education, and applied linguistics fields (Shulman, 1987; Driel et al., 1998; Meijer ,Verloop & Beijard, 2001; Smith, 2001; Borg, 2003; Kwong, 2007; Badawi, 2009; Za'za', 2011; König & Blomeke, 2012; Loughran, 2012; Choy et al. , 2013). Although these studies have been significant in furthering researchers' understanding of teachers' practical knowledge, it is assured by Arıoğul (2007) and Liu (2013) that there is still a lack of research particularly in the fields of applied linguistics and second/foreign language education.

Thus, teachers' pedagogical knowledge and pedagogical content knowledge base in teaching English to speakers of other languages (TESOL) is still an understudied area. Hence, the present research attempted to fill this gap through using a studio-based learning classroom to enhance preservice EFL Egyptian teachers' pedagogical knowledge. Moreover, the present research went further to investigate whether the pedagogical content knowledge of these preservice teachers was affected through assessing their teaching performance in the field practice. Therefore, the following three sections of the present research paper present literature review for main features of teachers' pedagogical knowledge, pedagogical content knowledge, and studio-based learning. The researchers of the current research hope that by attempting this understudied area of teachers' professional development, their research would elicit further empirical research based on it.

1.1. Pedagogical Knowledge (PK)

Teacher's pedagogical knowledge base was defined by Mullock (2006, p.48) as the "accumulated knowledge about the act of teaching, including goals, procedures, and strategies that form the basis for what teachers do in classroom". It was also explained by Valencia (2009) as the general set of methodologies and strategies that the teacher needs in order to carry out the teaching activity. Also, Hokkaido Teachers of English Project (HTEP) (2002) stated that:

> "The research about the role of the teacher in the instructional process yielded a profile of how complex classroom teaching is with hundreds of decisions being made by the teacher each minute. Further research identified how much pedagogical knowledge came to bear on each decision. Research literature defines this as the knowledge of teaching and learning theories, principles, and processes that cut across disciplines. It is also the skill in the use of teaching methods and strategies that are not subject-specific."

Badawi (2009, p.15) assured that "pedagogical knowledge refers to teachers' knowledge about the basic teaching/learning matters such as learning theories, teaching approaches, curriculum designs, evaluation techniques, and relevant managerial issues."

In a more detailed description of pedagogical knowledge, Lenhart (2010) described it as any theory or belief about teaching and the process of learning that a teacher possesses that influences that teacher's teaching. He further elaborated that this process includes the ability to plan and prepare materials; time and classroom management skills; implementation, problem solving, and teaching strategies; questioning techniques; and assessment.

As suggested by Mullock (2006), the study of this type of knowledge founded on the above conceptualization has its roots in the belief that all the practices carried out by teachers in the classroom are accompanied by some form of background thinking. Moreover, it is claimed that the sources of this type of knowledge come from philosophy, pedagogy, psychology, and research interested in capturing a general framework of teaching. However, there has been an expansion in regards to the sources which feed in general pedagogy (Banegas, 2012). According to König & Blomeke (2012), generic theories and methods of instruction and learning as well as of classroom management can be defined as essential parts of general pedagogical knowledge. They also added that Shulman (1987) stated that general pedagogical knowledge involves broad principles and strategies of classroom management and organization that appear to transcend subject matter as well as knowledge about learners and learning, assessment, and educational contexts and purposes. So, it could be inferred that an effective teacher must demonstrate knowledge of the subject being taught and knowledge of pedagogy.

Effective teachers are distinguished by The National Board for Professional Teaching Standards (1998) as "teachers who master pedagogical knowledge used to convey and reveal subject matter to students. They are aware of the preconceptions and background knowledge that students typically bring to each subject and of strategies and instructional materials that can be of assistance. In addition, they understand and solve the possible difficulties likely to arise in the classroom and modify their practice accordingly. Their instructional repertoire allows them to create multiple paths to knowledge, in general, and to the subjects they teach, in particular." This was later assured by the Teacher Education Done Differently Project (2010), as it declared that pedagogical knowledge is a key to successful teaching. It also added that effective mentoring for teaching encompasses articulation about pedagogy which requires timetabling, preparation, teaching strategies, and classroom management towards implementing practice and, other aspects such as, developing questioning skills, assisting in problem solving and providing information and guidance for assessment.

So, teacher's pedagogical knowledge can be subsumed into two categories: management of learning and management of resources (Tsui, 2003). According to Azma & Talebinejad (2012, p23-24), although

management of learning primarily involves classroom management, it is also concerned with out-of-classroom management. Classroom management refers to aspects of classroom organization, for example, using pair or group work, maintaining discipline, and dealing with daily business (e.g., collecting assignments). Out-of-class management refers to what teachers do before or after class to facilitate students' learning.

Review of literature suggested that there are many factors contributing to beginning teachers' development of pedagogical knowledge and skills. However, lesson planning and classroom management were areas that perceived as important by researchers and challenging by beginning teachers (Choy et al., 2013). So, the major concerns of the present research are the areas of lesson planning and classroom management.

Over the last decade, there have been a considerable number of teacher development researches that investigated teachers' pedagogical knowledge in a variety of areas of study. However, there has been an acknowledgement of the fact that in the field of teaching English as a foreign language, teachers' pedagogical knowledge base is an area which has been neglected in the literature (Ping, 2007 and Karimi, 2011). This is manifested by the small number of studies that tackled this area; Badawi, 2009; Karimi, 2011; Azma & Talebinejad ,2012; Liu ,2013; . Thus, TEFL/TESL teacher cognition is relatively a new field of study.

1.2 Pedagogical Content Knowledge (PCK)

Coining the term, pedagogical content knowledge (PCK), is crucial for effective teaching as it relates to the capability to represent and formulate content in a particular discipline in ways that are understandable to students (Lin et al., 2012). Thus, pedagogical content knowledge is that kind of teaching knowledge which makes a distinction between the expert teacher in a subject area and the subject expert who masters only the content knowledge.

Lee (2002) pointed out that general pedagogical knowledge is broad and unattached to specific knowledge and it includes classroom management techniques and instructional theories, but does not include the particular teaching strategies that comprise instruction strategies. Pedagogical content knowledge represents an effort to capture the "instruction strategies" teachers use when they teach specific subject matter content.

In addition, different terms are now used for the description of teachers' pedagogical content knowledge or PCK, regarded teacher knowledge as going beyond what the training or the disciplinary content has offered and comprised of a qualitatively different body of knowledge which also includes experience (Azma & Talebinejad, 2012). Whereas a teacher's knowledge of the subject area (content knowledge) may be personal and applied in many personal situations and experiences, these experiences in and of themselves do not necessarily foster understanding of subject or concepts for students. In other words, effective teachers cannot simply have an intuitive or personal understanding of a particular concept, principle, or theory. Rather, in order to foster understanding, they must themselves understand ways of representing the concepts for students which is represented in the term PCK (HTEP Project, 2002).

Koehler (2011) finds that pedagogical content knowledge is different from the knowledge of a disciplinary expert and also from the general pedagogical knowledge shared by teachers across disciplines. PCK is concerned with the representation and formulation of concepts, pedagogical techniques, knowledge of what makes concepts difficult or easy to learn, knowledge of students' prior knowledge, and theories of epistemology. It also involves knowledge of teaching strategies that incorporate appropriate conceptual representations to address learner difficulties and misconceptions and foster meaningful understanding.

As for the elements included in PCK, most researchers agreed on Shulman's two key elements—that is, knowledge of representations of subject matter and understanding of specific learning difficulties and student conceptions. In addition, there appears to be agreement on the nature of PCK. First, as PCK refers to particular topics, it is to be discerned from knowledge of pedagogy, of educational purposes, and of learner characteristics in a general sense. Second, because PCK concerns the teaching of particular topics, it may turn out to differ considerably from subject-matter knowledge by itself (Driel et al., 1998).

Shulman (1987) and Veal & MaKinster (1999) stated that PCK included those special attributes an effective teacher possessed that helped him/her guide a student to understand content in a manner that was personally meaningful. Shulman (1987) also wrote that PCK included "an understanding of how particular topics, problems, or issues are organized, presented, and adapted to the diverse interests and abilities of learners, and presented for instruction" (1987, p. 8).

In this regard, Koehler (2011) argued that having knowledge of subject matter and general pedagogical strategies, though necessary, were not sufficient for capturing the knowledge of good teachers. Specifically, being a teacher with pedagogical knowledge or just being able to speak the language you teach (with content or subject knowledge) are not sufficient for being an effective teacher of English. But a teacher of a subject must also be able to apply knowledge of how to teach specific aspects of English to a specific group. This is what is called PCK.

Unfortunately, in most countries, EFL/ESL students/teachers spend most of their times studying arts of the English language, not how to teach the language. This is assured by Zheng (2009, p.76);

> "It is necessary to know how student teachers view the importance of English subject matter as opposed to pedagogical knowledge. Students who major in English spend much more time on the course studying the language than on how to teach it. EFL students with four years' education in normal universities in China, for example, spend majority of their time learning language, with only two courses of teaching pedagogy and educational psychology two hours a week for 18 weeks (a term) respectively and another eight weeks' teaching practice. The 'inferior status' of pedagogical knowledge among foreign language students' courses will doubtlessly influence pre-service teachers' belief towards pedagogical knowledge, which will also affect their teaching practice. Some studies of teacher beliefs about subject have also argued that teachers can have very different views of their subject under different contexts"

Thus, the researchers of the current study agree with what was pointed out by Borg (2009) and assured by Baker & Murphy (2011); the value of any study that fails to bridge the crucial link between teacher cognition and teaching practice is questioned. And that the main objective of teacher cognition research is to generate a deeper understanding of the reasoning that underpins what teachers do in classrooms. Such research requires exploration of connections between teachers' knowledge, beliefs, and their actual classroom behaviors.

1.3 Studio-Based Learning: Definitions, aspects, and rationale

Mora & Mogilevsky (2013) argued that teachers operate in a complex and dynamic domain; the background knowledge and practices of their students constantly change, the technologies and resources at their disposal are perpetually evolving, and the guidance and directives they receive are frequently updated. This calls for a repositioning of educational professionals: from conveyors of knowledge to designers of learning.

According to Miller (2008, p.2), "a study from the National Training Laboratories in (2000) found that only about 5 percent of the information delivered through lecture was retained. Compare that with retention rates at 50 percent for discussion group and 70 percent for practice by doing. Even higher, at 80 percent, was retention by students teaching others". Miller went on to note that "It is not what the student knows; it is what they can do with what they know. With group work, you have a lot of social norming going on. You do not have the misbehaviors or distractions you might have with instructional teaching. Accordingly, the design of learning spaces should increase levels of engagement, foster active learning and teaching, and support the learning goals of higher education institutions. However, lecture continues to be the most prevalent teaching mode in secondary and higher education, despite overwhelming evidence that it produces the lowest degree of retention for most learners (Sousa, 2011).

The Magazine of Workplace Research, Insight, and Trends (2010) stated that colleges share many common problems:

- classrooms were built for lectures, not learning
- very limited flexibility inside classrooms
- student movement is limited (fixed tablet arms, chairs and tables without casters, etc.)
- interaction between students and instructors is constrained by space and furniture
- technology is poorly integrated into the classroom
- support for collaborative learning is inconsistent or nonexistent

It could be inferred from the above that the design of classrooms should be flexible enough to the extent that allows the teachers and learners to opt for the teaching styles and activities they find necessary in order to accomplish their learning objectives.

According to Leiboff (2010);

> "In contrast to the traditional lecture-oriented room, this increasingly popular kind of space, known as a "studio classroom," emphasizes group learning and collaboration. In studio teaching, the instructor serves as a facilitator, by handing out projects, answering questions, providing resources, and moving around the room as necessary. Students work in groups to learn, and activities are structured to emphasize collaborative, active, student-based learning. While the pedagogy is not new, the need to create learning spaces to meet the very specific needs of studio teaching has caused a dramatic re-thinking about how to design new classrooms. These new kinds of spaces will not and should not replace all traditional classrooms, as both configurations are necessary to meet the wide range of learning activities."

Furthermore, an important feature of studio class is that students have more control and responsibility for outcomes than in traditional class. Lecturers and Teaching Assistants (TAs) are mentors, acting as learning guides, providing the learning environment and materials needed for students to create their own learning. Lecturers help students to start on projects and are on hand as resources for students to use (Perkins, 2005). (See table 2)

Table 2: Comparison of a Studio Class with a Traditional Class Features

	Traditional Class	Studio Class
Meeting Times	Two or three 50 or 90-minute lectures and one lab per week	Two times per week in 50 min for lecture; two times per week in 90 min for studio
Lab Exercises	Completely separate from lecture; generally individual activities	Not separated from studio; generally group activities
Group Activities	Sometimes in lab sessions	The focus of the studio
Lecturer's Role	Authority, lecturer	Learning guide, class coordinator, a resource for students when needed
Lecturer's Time	About 3 contact hours per week; generally only in lecture sections	About 6 contact hours per week; both studio and lecture activities
TAs' Role	Assist lecturers	Aid lecturer, acts as student resource,
TAs' Role	About 3 contact hours per week;	About 9 contact hours per week; both

Adopted from Gok & Turkey (2011, p.52). Perceptions of the Students toward Studio Physics.

In the same respect, Estey (2010, p.16) provided survey results on his studio classroom use describing "how comfortable his students were in doing the peer review activities; whether it promoted self-reflection, as well as how it affected their sense of community, competition, motivation, class participation, level of excitement, and presentation confidence."

The term Studio-Based Learning (SBL) is meant to describe a general approach to interaction with students that is instructor facilitated, student centered, and hands on. When an audience is asked to describe what they do in a lecture hall, they invariably suggest activities such as: listen, take notes, chat, sleep, read, and so on. When asked what they think might happen in a studio they usually suggest: paint, draw, sculpt, write, and other active pursuits. The difference is clear. The focus in a lecture hall is on the work of the instructor. The focus in a studio is on the work done by the student. That is indeed the key distinction (Wilson & Jennings, 2000). Hence, the studio-based learning (SBL) model aims to promote learning in a social and collaborative context (Narayanan et al., 2012).

Moreover, Myneni (2009) defined studio-based learning (SBL) as an instructional technique that emphasizes collaborative, design-oriented learning. He also added that this pedagogy is not new; it dates back to old architectural schools where they have practiced this in the form of design studios where (a) students created their own work spaces, (b) students worked in groups to solve problems, and (c) students presented their solutions to the class to obtain feedback from their instructors and also from their peers.

According to the Science Education Resource Centre (2007), studio teaching is an approach to teaching that can be used to replace the standard lecture approach. It is based on sound pedagogical principles, is very flexible, is popular with students, and leads to superior learning in most instances. Furthermore, Monson et al. (2007) found that studio-based learning is a shared learning environment in which ambiguous problems are addressed iteratively through multi-modal analysis, proposition, and critique. This refers to the nature of discursive collaboration between students in their learning, as well as the physical space in which that learning occurs. Essential in the definition of SBL is the term "studio," which means a dedicated, collaborative work space in which novices collaborate with experts.

Describing studio courses, Wilson & Jennings (2000) stated that the studio classroom is mainly based on a learning environment which was designed to facilitate students' ability to interact with one another, with the lecturer, and with the course material during their time in lecture. So, they present better interactive learning environments for students and a better teaching environment for faculty. Also, Cennamo et al. (2011, p.13) described the studio classroom, as commonly used in design-related curricula such as architecture, landscape architecture, interior design, and industrial design, consists of a space where students are assigned individual desks that are, in most cases, available to them at all times. In their studio classes, students are presented with a design problem, work individually or in groups to solve it, and subject their work to reviews during formal and informal critiques.

Gok & Turkey (2011) declared that many lecturers have successfully used cooperative learning in their classrooms; studio teaching is a logical extension of that approach. Studio classrooms have many different manifestations but all share common elements. They involve longer, fewer, class sessions with focused, intense, student activity. Tables are arranged so students face each other instead of the front of the classroom. Also, Burroughs (2009) explained that the physical space of a studio provides a dedicated, collaborative workspace where students collaborate with experts. In SBL, learners talk to each other as much as or more than the teacher talks to the learners. The discourse is viewed as part of the proposal making or design process.

In addition, the Centre for Teaching Excellence, Cornell University (2013) found out that studio classrooms usually have following aspects:

- Experiential learning, or learning by doing.
- Lectures are not separate, but integrated within a studio session (lectures are shorter, around 20 minutes).
- Students acting as active learners with instructors as resources.
- Teacher-student and student-student collaborations.
- Assessing student work based on both the process of designing artifacts and presentation of the final product.
- Reflection on feedback on the design process and final product is an important part of learning.

In a studio classroom, there are many ways in which teachers can design instruction to promote learning with others. Students can discuss concepts in pairs or groups and share what they understand with the rest of the class. They can develop arguments and debate them. They can role-play or divide up materials about a given topic and then teach others about their piece. Together, students and the teacher can use a studio format in which several students work through a given issue, talking through their thinking process while the others critique and comment (Saavedra & Opfer, 2012).

Higgins et al. (2009) believe that properly conceptualised and delivered, studios can provide students with confidence, self- esteem, substantive knowledge about a topic and a range of generic skills including communications skills, creative problem solving and critical thinking.

Thus, studio classrooms have a huge number of benefits both for teachers and learners. Teaching Gateway (2013) stated the most important of these benefits:

> "Studio-based learning can be highly engaging for students, enabling them to develop capabilities in a holistic and authentic way. It situates learning in quasi-professional activities that enable students to integrate, reflect on and apply their learning, and thereby learn more deeply (Gibbs, 1992). We now recognise collaboration as being important to creativity in a professional context, and see creativity as being enacted and valued as much in a particular disciplinary context as in an interdisciplinary one (Csikszentmihalyi, 1996). Studio-based assessment allows for learning to be enriched by collaboration and team-work."

Studio-based learning also encourages risk-taking and curiosity, and such generic skills as communication, problem-solving, team-work, project management and independent learning. Studio-based teaching focuses on problem/project work and experimentation in a hands-on studio environment (Rosen, 2013). Moreover, Beichner & Saul (2003) stated that after using the studio-based learning environment, their students' abilities to solve problems was improved, conceptual understanding was increased, attitudes were improved, and failure rates were drastically reduced.

Zollars et al. (2012) have highlighted that studio- based learning offers many advantages for student instruction; in addition to being an active learning technique the construct-present-critique-respond cycle within SBL addresses all six cognitive levels of Bloom's taxonomy. An impediment to the incorporation of SBL in a typical class is the time constraint imposed by the usual one-hour long time block for most classes. Also, Bosman et al. (2012) agree with Tucker & Rollo (2005) that studios are invaluable learning and teaching contexts in many creative discipline areas. As a learning and teaching approach, studios' main value comes from shifting the role of the student from passive receiver of information to an active and engaged learner. Besides, the studio environment is full of potential and possibility, but only if the faculty member is able to effectively engage with the students in that environment to make the learning experience something more and different than could be achieved in a typical lecture class (Herrmann, 2012).

So, studio teaching is not just another kind of classroom activity. It is not a lab session, nor is it a series of class projects. It is an approach to teaching and learning that gets students actively engaged in directing their own learning. The instructor is not the focus of the class, as in traditional classrooms (The Science Education Resource Centre, 2008).

Docherty& Brown (2001) and The Science Education Resource Centre (2007) specified some characteristics of the studio classroom;

- Students work in groups to learn.
- Activities generally emphasize collaborative and cooperative learning.
- The instructors get students going on projects and are on hand as resources.
- Responsibility for learning is placed on the students.
- Class activities build on each other, providing a dynamic and integrated learning environment that emphasizes personal intellectual development as well as content learning.
- Projects can include discussions, debates, presentations, paper and pencil exercises, computer projects, work with samples, or any of a number of other things.
- Projects may be multifaceted and can take more than one class session.

- Instructors provide information, by way of short lectures, when needed or on demand, but full-length lectures are rare.
- Students plan and develop their own learning projects.
- Students apply the skills and knowledge learned in concurrent subjects to the specific real life scenarios provided by the projects.
- Students work collaboratively with other learners to develop knowledge and understanding.
- Students work as mentors and coaches.

Although the studio classroom seems to have all these promising aspects and benefits, few studies have investigated its effect on the area of teachers' professional development such as the studies of Brocato & Franz 2003; Burroughs et al., 2009 and Mathews, 2010. Most of the research used it as a means to develop design, English, architecture, and science skills in a variety of domains such as the studies of Wilson, 1997; Perkins, 2005; White, 2005; Gottfried et al., 2007; Estey, 2010; Musgrave & Price, 2010; Gok & Turkey, 2011 and Eshun & Osei-Poku, 2013.

Hence, the researchers of the present research were motivated to use a studio-based learning classroom as the independent variable of this research to enhance preservice teachers' pedagogical knowledge and investigate the effect of this treatment on their pedagogical content knowledge.

2. Context of the Problem

The main declared goal of EFL teacher preparation programs at faculties of education in Egypt is developing the knowledge of their students/teachers; content knowledge, pedagogical knowledge, and pedagogical content knowledge. However, in spite of their stressed importance, pedagogical knowledge and pedagogical content knowledge are not fully developed for students/teachers at the Faculty of Education in Helwan University. This was apparently affecting their teaching performance and attainment of the objectives of the subject adversely as was manifested by a number of Egyptian private language schools' refusal to employ many of those teachers.

Moreover, being a part in students/ teachers' trainers staff at the Department of Curriculum and Instruction at the Faculty of Education in Helwan University, the researchers took part in training various groups of EFL students/teachers. The researchers observed that most of the second and third year students suffered from pedagogical knowledge and pedagogical content knowledge-related problems that were obvious in their lesson plans and teaching performance during the teaching practicum. Consequently, the researchers examined their results of the previous year, and noticed that most of those students hardly passed exams of the EFL teaching skills and EFL Methodology courses.

Therefore, the researchers of the present research decided to employ an untraditional training method ; a studio-based learning classroom to enhance the pedagogical knowledge of the second year students/teachers in the academic year 2012/2013 and investigate how this training will reflect upon their pedagogical content knowledge.

3. Statement of the Problem

The research problem could be summarized in the following statement: the second year EFL students/teachers, Faculty of Education, Helwan University lacked the pedagogical knowledge and pedagogical content knowledge necessary for them as prospective teachers of English. Thus, in an attempt to solve this problem, the present study utilized a studio-based learning classroom to develop the required pedagogical knowledge for those students/teachers and investigated its effect on their pedagogical content knowledge.

4. The Research Questions

To tackle this problem, the present research attempted to answer the following main question :-

What is the effect of a studio-based learning classroom on enhancing the pedagogical knowledge and pedagogical content knowledge of the second year EFL students/teachers, Faculty of Education, Helwan University?

The following sub-questions were derived from the above main question:

1. What is the effect of the proposed studio-based learning classroom on enhancing the pedagogical knowledge of the second year EFL students/teachers, Faculty of Education?
2. How far will enhancing the pedagogical knowledge of the second year EFL students/teachers, Faculty of Education, Helwan University affect their pedagogical content knowledge?

5. The Research Aims

This research aimed at:

1. Designing a studio-based learning physical environment.
2. Designing studio-based learning collaborative activities.

3. Measuring the effect of the proposed studio classroom on EFL students/teachers' pedagogical knowledge.
4. Exploring the correlation between enhancing pedagogical knowledge and pedagogical content knowledge of the EFL students/teachers.

6. The Research Hypotheses

The present research tested the following hypotheses:

1. There is a statistically significant difference between the mean scores of the control group (exposed to traditional lectures) and the mean scores of the experimental group (exposed to the studio-based learning classroom) on the post-administration of the pedagogical knowledge pre/post test in favor of the experimental group.
2. There is a statistically significant difference between the mean scores of the control group (exposed to traditional lectures) and the mean scores of the experimental group (exposed to the studio-based learning classroom) on the administration of the pedagogical content knowledge rubric in favor of the experimental group.

7. Research Design and Variables

- **Design:** The present research used the two-group quasi-experimental design. The participants were randomly divided into two groups. The experimental group exposed to studio-based learning classroom whereas the control group exposed to traditional lecturing.
- **Independent Variable:** This refers to the treatment implemented with the experimental group in this study (the proposed studio-based learning classroom)
- **Dependent Variables:** This referred to the development in the experimental group's pedagogical knowledge and pedagogical content knowledge targeted by the treatment.

8. Research Delimitations

Since it is beyond the limits of a single research to consider a wide range of factors, the present research was confined to:

1. A sample of second year EFL students/teachers, Faculty of Education, Helwan University.
2. Developing and measuring pedagogical knowledge and pedagogical content knowledge about: First, classroom management; preventing and reacting to learners' problem behavior. Second, lesson planning; elements of lesson plans and designing lesson plans addressing learners' various learning styles.
3. The proposed studio-based learning classroom employed the following collaborative activities: Role play, gallery walk, case studies, think-pair-share, group projects, jigsaw, and debates.

9. Research Significance

It is hoped that the present research results would contribute to:

1. Further affirmation on the importance of developing teachers' pedagogical knowledge and pedagogical content knowledge in Egypt.
2. Leading a move towards instructors that adopt studio-based learning.
3. EFL prospective teachers need familiarity with new teaching /learning methods, among which is the studio-based learning.
4. Developing the teaching performance of EFL teachers graduated from Faculty of Education, Helwan University.

10. Research Procedures

In order to achieve its aims, the present research went on the following steps:

1. Reviewing literature and previous studies related to areas of the present research.
2. Designing the proposed studio-based learning classroom on the physical level; chairs, tables, datashow set, ect. and on the instructional level; videos, handouts, ect .
3. Developing a pedagogical knowledge pre/post test and a pedagogical content knowledge rating rubric scale and ensuring their reliability and validity.
4. At the beginning of the second term of the academic year 2012/2013, the researchers chose a research sample of the second year EFL students/teachers and randomly divided them into two groups, i.e. an experimental group (N=38) and a control group (N=38).
5. Administering the pedagogical knowledge pre/post test as a pre-test to the experimental and control groups before the treatment.

6. Training the experimental group in the proposed studio-based learning classroom while the control group received traditional lecturing in the same targeted knowledge areas; classroom management and lesson planning. The experiment lasted for 8 weeks during which the experimental group participants were coached to collaboratively perform role play, gallery walk, case studies, think-pair-share, group projects, jigsaw, and debates. Information pertaining to classroom management and lesson planning were mainly presented to them through videos, PowerPoint presentations, case studies or think-pair-share. Also, short (15 minutes) and long (60 minutes) presentations were delivered by the participants as group projects.
7. Administering the pedagogical knowledge pre/post test as a post-test to the experimental and control groups after the treatment.
8. At the beginning of the first term of the academic year 2013/2014, the researchers administered the pedagogical content knowledge rubric to the experimental and control groups during their teaching practicum.
9. Analyzing data using suitable statistical means.
10. Coming to the results and interpreting them, reaching conclusions, introducing recommendations, and giving suggestions for further research.

11. Definitions of Terms

In light of the research aims and the insights gained from the review of literature, the current research defines the basic terms operationally for the sake of measurement as follows:

11.1 Pedagogical Knowledge:

Pedagogical knowledge is teacher's knowledge about broad principles and strategies of classroom management and organization that appear to transcend subject matter as well as knowledge about learners and learning, assessment, and educational contexts and purposes. Operationally, the pedagogical knowledge refers to EFL prospective teachers' awareness of two teaching/learning areas namely; classroom management and lesson planning.

11.2.Pedagogical Content Knowledge:

Pedagogical content knowledge is a form of practical knowledge that is used by teachers to guide their actions in highly contextualized classroom setting. Operationally, the pedagogical knowledge refers to EFL prospective teacher's ability to convert their pedagogical knowledge into actions in the classroom in order to produce effective classroom practice that helps promote learning.

11.3 Studio- Based Learning:

Studio-based learning is a collaborative, mentoring, hands-on approach to teaching and learning. Operationally, studio classrooms emphasize group learning and collaboration. In studio teaching, the instructor serves as a facilitator, by handing out projects, answering questions, providing resources, and moving around the room as necessary. Students work in groups to learn, and activities are structured to emphasize collaborative, active, student-based learning.

12. Research Instruments

The researchers designed and used the following instruments to collect the required data:

1. **The Pedagogical Knowledge Pre/Post Test:** it was designed to be used as a pre/post test to assess the EFL prospective teachers' pedagogical knowledge in relation to 2 main topics. Each main topic included 2 sub-topics. First, classroom management; preventing and reacting to learners' problem behavior. Second, lesson planning; elements of lesson plans and designing lesson plans addressing learners' various learning styles. Each sub-topic was covered by 8 multiple choice test items. The total test score was 32 marks where two marks were devoted to each correct answer and zero to the wrong one. Test time was 80 minutes. Technically, the test validity was evaluated by 4 TEFL experts who reviewed the test and approved its validity in terms of its content and format. According to the result of the test-retest procedure, the test proved reliable where (r) = 0.79.
2. **The Pedagogical Content Knowledge Rubric:** it was designed to assess EFL prospective teachers' pedagogical content knowledge in both research groups. The analytical rubric scope was limited to the participants' performance related to the two targeted topics; 4 sub-topics. Each sub-topic included 5 levels (standards): tolerable (3 scores), beginning (5 scores), developing (7 scores), accomplished (9 scores), and exemplary (11 scores). So, the total score of the rubric was 44 marks. To find out whether or not the rubric was valid for what it was intended to measure, the researchers submitted the first form of the rubric to 4 TEFL experts to evaluate it; in terms of content, format, and criteria. Submitting the rubric to the jury members resulted in modifying it according to their suggestions. According to the result of the test-retest procedure, the rubric proved reliable where (r) = 0.85.

13. Research Results

The following table shows that there was no statistically significant difference between the mean scores of the control and the experimental groups on the post-administration of the pedagogical knowledge pre/post test.

Table 3. "t" Value of the Difference Between the Mean Scores of the Experimental and Control Groups' Students on the Pre-Administration of the Pedagogical Knowledge Test

Group	N	Mean	Std. Deviation	Calculated t-value	Significance level
Control	38	13	4	1.21	.216 (Non significant at 0.01)
Experimental	38	14	3.7		

(Table 3) demonstrates that the mean scores of the experimental group (3.7) are seemingly similar to the mean scores of the control group (4) on the pre-administration of the Pedagogical Knowledge Test. The difference between the two mean scores is statistically insignificant where the calculated t value is (1.21). This result assures that the two groups are equal in terms EFL teachers' pedagogical knowledge which in turn assures sample homogeneity. The result is expected since the two groups did not receive any formal education pertinent to the content of the Pedagogical Knowledge Test.

Table 4. "t" Value of the Difference Between the Mean Scores of the Experimental and Control Groups' Students on the Post-Administration of the Pedagogical Knowledge Test

Group	N	Mean	Std. Deviation	D.F.	Calculated t-value	Significance level	Effect size
Control	38	15.8	4	74	13.1	(.000) Significant at 0.01 level	3.04 Large
Experimental	38	28.78	4.5				

As displayed in (Table 4), the mean scores of the experimental group (28.78) are higher than the mean scores of the control group (15.8) on the post administration of the Pedagogical Knowledge Test. The difference between the two mean scores is statistically significant where the calculated t value is (13.1). Accordingly, the first hypothesis was verified; "There is a statistically significant difference between the mean scores of the control group (exposed to traditional lectures) and the mean scores of the experimental group (exposed to the studio classroom) on the post-administration of the pedagogical knowledge pre/post test in favor of the experimental group." This result reveals that the studio-based learning classroom has a larger effect than the traditional lectures on enhancing the pedagogical knowledge of the EFL students/ teachers. This is further affirmed by the large effect size (3.04) of the studio-based learning classroom treatment.

Table 5. "t" Value of the Difference Between the Mean Scores of the Experimental and Control Groups' Students on the Administration of the Pedagogical Content Knowledge Rubric

Group	N	Mean	Std. Deviation	D.F	Calculated t-value	Significance level	Effect size
Control	38	24.3	9.96	74	3.6	(.000) Significant at 0.01 level	0.83 Large
Experimental	38	31.8	7.84				

As shown in (Table 5), the mean scores of the experimental group (31.8) are higher than the mean scores of the control group (24.3) on the post administration of the Pedagogical Content Knowledge Rubric. The difference between the two mean scores is statistically significant where the calculated t value is (3.6). Accordingly, the second hypothesis was verified; "There is a statistically significant difference between the mean scores of the control group (exposed to traditional lectures) and the mean scores of the experimental group (exposed to the studio classroom) on the administration of the pedagogical content knowledge rubric in favor of the experimental group."

14. Discussion of the Research Results

The statistical analysis results of the mean scores of the pre-administration of the pedagogical knowledge test indicated that there was no significant difference between the experimental and the control group students in the targeted pedagogical knowledge areas. Moreover, students/teachers' mean scores in both groups were low. Therefore, it could be stated that any variance that occurred between the two groups after the application was attributed to studio-based learning classroom treatment. Thus, in the light of the post- administrations of the test pedagogical knowledge and the pedagogical content knowledge rubric results of the present study, the researchers could safely affirm that the studio-based learning classroom utilized accounted for the following:

First, the statistically significant difference between the mean scores of the control group (exposed to traditional lectures) and the mean scores of the experimental group (exposed to the studio classroom) on the post-administration of the pedagogical knowledge pre/post test in favor of the experimental group. The researchers of the current research believe that the development of the targeted pedagogical knowledge areas for the experimental group might be due for the dynamic nature of the collaborative activities employed in the studio

classroom; namely, role play, gallery walk, case studies, think-pair-share, group projects, jigsaw, and debates. As they have observed that the participants of the experimental group highly interacted with each others and worked in harmony to achieve their goals especially during group projects and case studies. Moreover, debates proved to be highly engaging for most of the experimental group participants as they presented challenges to their thinking and communicating abilities.

Second, the statistically significant difference between the mean scores of the control group (exposed to traditional lectures) and the mean scores of the experimental group (exposed to the studio classroom) on the administration of the pedagogical content knowledge rubric in favor of the experimental group. Although the effect size of the treatment on the students/teachers' pedagogical content knowledge was large (0.83), the researchers expected that it would be greater. This might be due to the time span that separated the studio-based learning classroom training and the actual teaching practice of the two groups. This might also be due to the short duration of the treatment on pedagogical knowledge (8 weeks) or that teachers' pedagogical content knowledge naturally needs more time to be developed and practiced regardless to the type of learning or training experience. Moreover, developing EFL prospective teachers' pedagogical content knowledge needs field experience under the supervision of a TEFL expert. However, there is still evidence to a possible positive correlation between enhancing students/teachers' pedagogical knowledge and developing their pedagogical content knowledge. This positive correlation needs more empirical research to be confirmed.

15. Research Conclusions

Based on the results of this research, it could be concluded that the present research provided an evidence that studio-based learning is more effective than traditional lectures in developing EFL students/teachers' pedagogical knowledge. Furthermore, there is evidence of interrelatedness between students/teachers' pedagogical knowledge and their pedagogical content knowledge. The findings of this research provided an indication to a positive correlation that exists between enhancing students/teachers' pedagogical knowledge and developing their pedagogical content knowledge.

16. Research Recommendations

In the light of the results of the present research, the following recommendations are suggested:

- Students/teachers' pedagogical knowledge and pedagogical content knowledge are not less important than their content knowledge, so they should be given more attention in Egyptian EFL faculties of education.
- Developing EFL prospective teachers' pedagogical knowledge and pedagogical content knowledge via studio-based learning is worthwhile and requires more investigation.
- Scrupulous empirical research is urgently needed to investigate the connection between students/teachers' pedagogical knowledge and their pedagogical content knowledge in a broader range.
- Faculties of education should prepare flexible physical learning environments that suit employing various instructional methods in teacher preparation.

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