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# The Effect of Moodle-Integrated Learning Platform on ELT Pre-service Teachers' General Pedagogical Knowledge

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## Abstract

This study aims to determine the effects of Moodle-integrated learning environments on pre-service teachers' general pedagogical knowledge and performance. The study was conducted using a quasi-experimental research design with eighty-seven teacher candidates. Data from the study was collected via a placement test, a performance test, and three general pedagogical knowledge tests. A one-way between-subjects covariance and a mixed between-within-subjects analysis of variance were used to analyze the descriptive data statistics. The initial findings indicated no significant difference between the groups' placement test scores prior to the Moodle integrated learning platform support. The performance test, administered after the intervention, indicated that students in the experimental group significantly outperformed students in the control group. The results also highlighted that Moodle effectively prepared students for learning by building general pedagogical knowledge.

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## Introduction

In the last two decades, the impressive developments in communication technologies and the increasing popularity of the World Wide Web (www) have led to significant changes in the delivery of teaching and learning services (Brandl, 2005; Escobar-Rodriguez & Monge-Lozano, 2012; Keramati, Afshari-Mofrad, & Kamrani, 2011; Mora Bonilla, Sarmiento Moreno, & Merida Casermeiro, 2010; Payette & Gupta, 2009; Zou, Liu, & Yang, 2012). The process initially started with blackboard applications, moved on to desktop applications, and ended up with online applications (Mora Bonilla *et al.*, 2010). These e-learning applications have become more widespread and complicated (Escobar-Rodriguez & Monge-Lozano, 2012). Learning programs, written with such programming languages as Pascal, C Plus, and Basic, have been replaced by Flash, Dreamweaver, and FrontPage-based XML applications (Brandl, 2005). However, these applications require design, time, and advanced-level programming skills, particularly XML applications, whereas users search for simple, user-friendly, and improvable applications. In this respect, learning-management (LM) and course-management systems (CMS) accommodating all these features have been developed (Kakasevski, Mihajlov, Arsenovski, & Chungurski, 2008; Mora Bonilla *et al.*, 2010).

CMS-supported learning receives considerable attention since it makes learning independent of time and place (Kakasevski *et al.*, 2008). In addition, CMS-supported learning provides instructors with the opportunity to

manage online courses through designing, adding, and modifying courses (Martin-Blas & Serrano-Fernandez, 2009). With the rapid increase in these applications, educational institutions now have an excellent opportunity to use the internet as a communication tool with students worldwide. In literature, researchers have discussed the features of these systems, the adaptations of new strategies into their own countries, relevant applied samples, and the results of related evaluations. It is widely agreed that these applications could transform theory into practice. In that way, new opportunities for pedagogical innovations could be implemented. With these applications, education has been transformed from theory into applied science to provide professionals with applied education (Imbernón, Silva, & Guzmán, 2011). They have also transformed how professionals teach, and students learn (Chao, 2008; Ciudad, 2010; Escobar-Rodriguez & Monge-Lozano, 2012; Fillion, Limayem, Laferrière, & Mantha, 2007; Mora Bonilla *et al.*, 2010).

The technological reform movement in the last two decades has resulted in numerous studies on the effect of e-learning applications on students' achievement and motivation (Hamid, Salleh, & Laxman, 2020; Keramati, Afshari-Mofrad, & Kamrani, 2011; Seluakumaran, Jusof, Ismail, & Husain, 2011; Johnson, Hornik, & Salas, 2008; West, Waddoups, & Graham, 2007; Arbaugh, 2000). However, few have drawn on Moodle applications in an educational context (Carvalho, Areal, & Silva, 2011). Much of these have been descriptive studies, having narrow scopes and mainly focusing on participants' thoughts, satisfaction, attitudes, and perceptions regarding Moodle (Melton, 2006, Swan, 2001; Hanson & Robson, 2004; Lon & Teasley, 2009), whereas few of them have examined the influence of Moodle on students' achievement (Beatty & Ulasewicz, 2006, Chou & Liu, 2005; Martin-Blas & Serrano-Fernandez, 2009; McGill & Klobas, 2009; Zou, Liu, & Yang, 2012). For example, Liao and Lin (2011) investigated the interactive attitudes of students in a Moodle-supported optional energy course. Another example of the studies carried out on Moodle is the study conducted by Nunez *et al.* (2011). They modified Moodle to train university students on studying and self-regulation strategies and examined the program's effect. These studies might have been much more persuasive if the authors had used an experimental design. Thus, there is a necessity in experimental studies to examine the effect of Moodle. This paper will focus on the effect of Moodle on students' general pedagogical knowledge via experimental research design.

## **Improvements in Moodle**

Course Management Systems (CMS) or Learning Management Systems (LMS) have quickly become widespread and increased in popularity throughout the world (Carvalho *et al.*, 2011; Escobar-Rodriguez & Monge-Lozano, 2012; Godwin-Jones, 2003; Guerra, González & García, 2010; Martin-Blas & Serrano-Fernandez, 2009). Among these systems, the most common is Modular Object-Oriented Dynamic Learning Environment (Moodle) (Brandl, 2005; Escobar-Rodriguez & Monge-Lozano, 2012; Mora Bonilla *et al.*, 2010). Moodle is a verb meaning something like a cross between 'muse' and 'doodle,' describing a kind of creative tinkering (Moodle, 2021). It is the best-known and widely used CMS or LMS platform for sharing information, documentation, and knowledge management (Mora Bonilla *et al.*, 2010; Uribe-Tirado, Melgar-Estrada, & Bornacelly-Castro, 2007). Nowadays, Moodle is used by thousands of people in 241 countries (Moodle, 2021). The distribution of Moodle use is presented in Table 1. In this table, the rapid development of Moodle over the years can be observed (Moodle, 2021).

Table 1. Moodle Statistics from 2005 to 2021

	November 2005	November 2021
Registered sites	4278	183000
Countries	NID	241
Courses	175808	39000000
Users	1833407	303000000
Enrolments	2583734	1704000000
Forum posts	2031634	674000000
Resources	1053699	332000000
Quiz questions	1200804	6069000000

The statistics indicate that there has been a considerable increase in Moodle use. In Turkey, 1034 sites use Moodle. One of them is Osmangazi University. For the spring term of 2021-2022, almost all the courses given at the university are included in the ESOGÜ Course Management System (Esuzem, 2021).

The most important reason for such widespread use of the Moodle application is its access-free feature, unlike other applications such as WebCT, Blackboard, TopClasse, and so on - (Escobar-Rodriguez & Monge-Lozano, 2012; Cejudo, 2007). Furthermore, it is the most common program among CMS, thanks to its flexibility. It could serve any desired purpose; it can be adapted and developed according to needs; it can be shared with the whole community, and it is also open-source software. This program's philosophy is a high level of instructor control and a low level of administrator control. The instructor can easily control the sources during the course design process and rarely consult the administrator (Beatty & Ulasewicz, 2006; Carvalho *et al.*, 2011; Cejudo, 2007; Moodle, 2021; Seluakumaran *et al.*, 2011; Zou *et al.*, 2012; Bergeren *et al.*, 2005; Rice, 2008; Rice & Nash, 2010).

As in most other e-learning environments, the social constructivist theory constitutes the basis of the design and development of Moodle (Brandl, 2005; Doolittle, 1999, Kök, 2008; Wood, 2010). As long as individuals interact with the environment, they construct their knowledge in constructivist learning. All newly-acquired knowledge is compared with previous knowledge, and if it is appropriate, applicable, and beneficial, it is formed as new knowledge. In social constructivism, the group factor is also essential for learning. It adopts the principle that theory learning is constructed within the group. While constructing meaning in a social context, individuals influence others' thinking by sharing the meaning they have formed, and these individuals are influenced by other individuals (Fer & Cırık, 2007; Kök, 2008). In the same vein, Moodle has based on the premise that individuals learn best when they share, collaborate, and are together. It offers various types of activities, such as forums, glossaries, wikis, assignments, quizzes, choices, databases, questionnaires, and resources to increase collaboration (Cole & Foster, 2008; Moodle, 2021; Rice, 2008; Rice & Nash, 2010; Romero, Ventura, & García, 2008).

Additionally, the model's strength is to build each activity upon the outcome of the previous activity, so the transition between activities is smooth, and there is consistency in the course flow. Moreover, the system allows

the teacher to control the users' entries and see the users' IP numbers, the activity type, the sources used, and the assignments completed and uploaded. In this way, the teacher can effectively guide and monitor the course (Moodle, 2021).

### **General Pedagogical Knowledge: Cognitive Component of Teacher Competence**

Teacher training programs aim to develop knowledge bases of pre-service teachers, which shape their future teaching performances and quality of education. Content knowledge (the knowledge of the subject), pedagogical content knowledge (the knowledge about teaching and learning a specific subject), and general pedagogical knowledge (GPK) (not linked to subject matter; GPK) are the three fundamental knowledge bases (Shulman, 1986). The courses offered in teacher training programs develop pre-service teachers' subject matter knowledge and pedagogical knowledge, influencing the quality of their future teaching performances. The educational sciences courses offered in teacher training programs aim to lay the foundations of general pedagogical knowledge. Additionally, several methodology courses, which are subject-specific courses, particularly on language teaching methods and techniques such as Approaches in ELT, Teaching Language Skills I-II, ELT methodology courses, and Teaching English to Young Learners, are aimed to improve specifically the students' pedagogical content knowledge but contributed and reinforced the students' general pedagogical knowledge in a broad context.

General pedagogical knowledge (GPK) is accepted as one of the central cognitive elements in teachers' professional competence. Shulman (1987) defined GPK as 'broad principles and strategies of classroom management and organization, knowledge of learners and learning, assessment, educational contexts and educational purposes across different subject domains' (p. 8). Guerrio (2017) extended the definition as 'the specialized knowledge of teachers in creating and facilitating effective teaching and learning environments for all students, independent of subject matter' (p.80). While many empirical studies have been conducted about content and pedagogical content knowledge, teachers' GPK is still less studied (König, Blömeke, Paine, Schmidt, & Hsieh, 2011).

To assess pre-service teachers' or teachers' GPK, two different approaches have been adapted as the perceived level of knowledge and testing of knowledge. Recently, measuring the level of GPK with a test has come into effect, starting with the studies based on teacher education and development study in mathematics (TEDS-M) (König *et al.*, 2011). The test included four main topics: structure, motivation/classroom management, adaptivity, and assessment. Different versions and adaptations of that test have been used (König, Lammerding, Nold, Rohde, Strauß & Tachtsoglou, 2016; Lauermaann & König, 2016; Malva, Leijen, & Baucal, 2019). The studies cover general pedagogical knowledge focused on the correlation between content knowledge, pedagogical knowledge, and general pedagogical knowledge (Ulferts, 2019) and general pedagogical knowledge during teacher education, mainly teaching practice (e.g., Malva *et al.*, 2019). However, how general pedagogical knowledge can be constructed through different instructional modes, specifically technology-supported, has not been studied, particularly with pre-service English teachers.

## **Method**

### **Research Design**

This study employed a quasi-experimental research design including two groups (experimental and control) and a pre-test - post-test design to investigate the role of Moodle on building students' general pedagogical knowledge and their performance in this course. Students enrolled in ELT Methodology Course in two sections in Education Faculty at Eskisehir Osmangazi University were assigned as experimental and control groups. The interventions started after midterms and lasted six weeks. Both groups took one placement test, three general pedagogical knowledge tests, and a performance test. This study used Moodle as a digital platform for preparing students to build general pedagogical knowledge as a part of language teaching learning processes. While students in the control group were advised to construct their general pedagogical knowledge based on written documents and course books, students in the experimental group were advised to participate in Moodle discussions, presentations, forum sessions, etc.

### **Participants**

The study participants were 87 third-year students in the Department of Foreign Language Education enrolled in the ELT Methodology Course at the Faculty of Education in Eskisehir Osmangazi University. Forty-four students were assigned as Section A and 43 as Section B. The same instructor taught both groups. Both groups have similar characteristics. For instance, both programs have similar background knowledge on teacher education. Both groups' program entrance scores were almost identical. Both groups were of mixed gender and mixed ability. Thus, to assign which group was the control or experimental group, a placement test, which was also used as a midterm examination, was administered to both groups. The placement test scores showed no significant difference in the mean scores in Section A [ $t(85) = 0,283, p = 0,78$ ]. Consequently, 44 Section B students were assigned as the experimental group, and 43 Section, A students, were assigned as the control group.

### **Instruments**

For data collection, placement and performance tests and general pedagogical knowledge tests were used to evaluate the effects of Moodle integrated learning environment on the development of general pedagogical knowledge of ELT pre-service teachers.

#### *Placement Test and Performance Test*

The placement test used in this study was primarily developed as a placement test to assess pre-service teachers' general pedagogical knowledge. The test consisted of 40 multiple-choice items. Test items were developed based on course objectives regarding pre-service teachers' general pedagogical knowledge covering classroom management, knowing about learners, planning, arranging the class, classroom dynamics. The test item analysis showed that the test's item-difficulty index was 0.38; the item-discrimination index was 0.40, and the KR20

reliability coefficient was 0.73. Item difficulty can range from 0.0 (none of the students answered the item correctly) to 1.0 (all students answered the item correctly). In other words, the more the value found is closer to 0, the more complex the item is, and the more the value found is closer to 1, the easier the item is. The value of 0.50 demonstrates that the item has a moderate difficulty level (REF). Items with item-discrimination indices of 0.30 or over have a good discrimination power. Thus, item analysis indicated that items in the placement test had good measurement indices (Büyüköztürk, Kilic, Akgün, Karadeniz & Demirel, 2018).

The performance test, administered after the intervention, was developed to evaluate both groups' general pedagogical knowledge training performance. The test included 40 multiple-choice items, some of which were chosen among the placement test items. The item analysis was conducted after the administration of the test. The results indicated that the item-difficulty index was 0.43, the item-discrimination index was 0.35, and the KR20 reliability coefficient was 0.72. These indices showed good values for measurement.

### *GPK Test*

The GPK test is designed to measure knowledge allowing teachers to prepare, structure, and evaluate lessons ("structure"), to motivate and support students, as well as manage the classroom ("motivation/classroom management"), to deal with heterogeneous learning groups in the classroom ("adaptivity"), and to assess students ("assessment"). In this context, the researcher developed three GPK tests precisely through the literature review, referring to Shulman's (1986) and König et al. (2011) frameworks and considering the course outcomes and course books in particular. Each test included 25 multiple-choice items questioning certain cases related to general pedagogical knowledge. The items were analyzed with the Iteman item analysis program. The results of the analysis are presented in Table 2.

Table 2. Results of analysis of General Pedagogical Knowledge Test

	GPK TEST1	GPK TEST2	GPK TEST3
Item difficulty indices	0.45	0.56	0.55
Item discrimination indices	0.42	0.37	0.39
KR-20 Reliability coefficient	0.82	0.74	0.78

The results of item analysis showed that the item difficulty indices of the tests ranged between 0.45 and 0.56. This finding showed that GPK tests had a moderate level of difficulty. The item-discrimination indices of the tests ranged between 0.37 and 0.42. Thus, it could be stated that the item-discrimination indices of the tests were relatively high. Finally, the KR20 reliability coefficients ranged from 0.74 and 0.82. Accordingly, it was concluded that the GPK tests can be evaluated as reliable measurements.

### **Procedure**

The interventions started after the midterms. The course instructor advised both groups to read the related parts from course books and provided them with PowerPoint presentations and lecture notes to prepare students for

the following lessons. The instructor taught the six units of the schedule via lectures, made classroom discussions, and used question and answer techniques. He did not make any assessment until the midterms. The intervention started just after the midterm, also used as a placement test to assign the experimental and control groups. First, the Moodle course management system was utilized to deliver the remaining six learning units for the experimental group. It was ensured that all of them could access the system. To assist the participants in preparing for face-to-face meetings, the instructor provided them with PowerPoint slides, lecture notes, assignments, discussion notes, and other similar documents related to the content of the next face-to-face meetings. The instructor moderated the discussion sessions on the system and ensured that everyone participated in the activities. Students' access records were followed carefully, and participants who did not participate in the sessions were encouraged to attend Moodle sessions.

To help participants in the control group prepare for the next meeting, they were advised to read related chapters and were provided with PowerPoint presentation files, course notes, discussion topics, and tutorials. The instructor had no contact with control group students until the next meeting. Both groups were tested via GPK tests every two weeks just before the face-to-face meetings and were taught via direct teaching methods, as in the meetings, before the intervention. At the end of the intervention, both groups administered the performance test.

### **Data Analysis**

- A one-way between-subjects covariance design was used to assess the effectiveness of Moodle-integrated instruction and traditional face-to-face instruction on participants' general pedagogical knowledge and course performances.
- A mixed between-within-subjects analysis of variance was conducted to assess the effectiveness of two different ways to build general pedagogical knowledge.

### **Results**

In the study, a one-way between-subjects covariance design was initially used to assess the effectiveness of two different ways on participants' general pedagogical knowledge. Eighty-seven teacher candidates were exposed to either a Moodle integrated method or a traditional face-to-face method; in the end, they were tested on general pedagogical knowledge. The dependent variable was the scores of the two groups for the performance test. The placement test scores were used as a covariate in the analysis. Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, and reliable measurement of the covariate. After adjustment for placement scores, findings showed a significant difference between the two groups on performance test scores,  $F(1, 84) = 0.15$ ,  $p = 0.01$ , partial eta squared = 0.15. There was a relationship between the placement test and performance test scores, as indicated by a partial eta squared value of 0.16. The mean differences in the groups are shown in Table 3.

Table 3 Comparison of Participants' Placement Test Scores and Adjusted Performance Test Scores

Groups	n	Placement Test	Sd	Adjusted Mean	Std. Error
		Mean			
Control group	44	65.23	10.51	71.60	1.25
Experimental group	43	64.54	10.73	78.48	1.27

It is clear from this analysis that the Experimental Group produced a more remarkable overall improvement on the performance test ( $M_{adj} = 78.48$ ,  $SE = 1.27$ ) than the Control Group ( $M_{adj} = 71.60$ ,  $SE = 1.25$ ) when adjusted for placement scores. It can be concluded that participants who used Moodle as a tool to construct general pedagogical knowledge made a more remarkable improvement in the performance test than the participants who were advised to prepare for the next learning unit (see Figure 1).

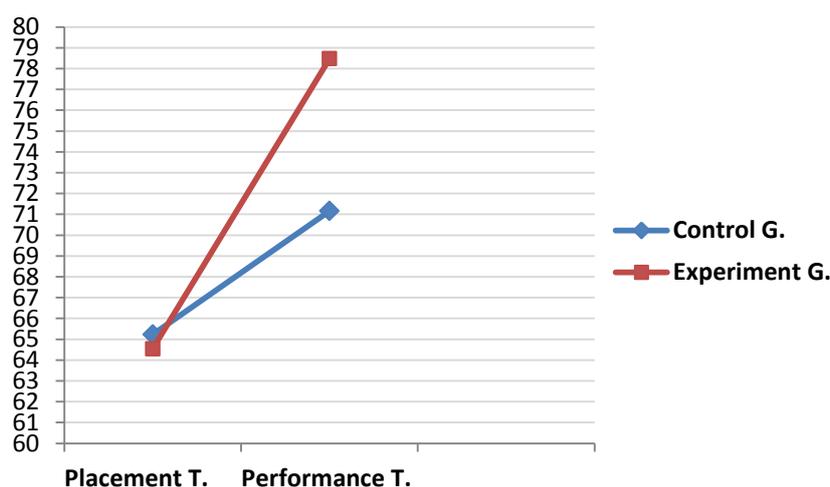


Figure 1. Experimental and Control Group Students' Placement and Performance Test Scores

In the study, a mixed between-within subjects analysis of variance was then conducted to assess the impact of a Moodle integrated method and traditional face-to-face methods to construct participants' general pedagogical knowledge, tested by GPK TEST1, GPK TEST2, and GPK TEST3. The placement test scores were used as a covariate in this analysis. The findings indicated that there was a significant interaction between the general pedagogical knowledge construction type and measurements, Wilks Lambda = 0.93,  $F(2, 84) = 3.37$ ,  $p = 0.04$ , partial eta squared = 0.07. There was a substantial main effect for measurements, Wilks Lambda = 0.49,  $F(2, 84) = 43.22$ ,  $p = 0.01$ , partial eta squared = .51, with both groups showing an improvement in General pedagogical knowledge tests scores across the three measurements (see Table 4).

The main effect comparing the two types of general pedagogical knowledge construction was significant,  $F(1, 85) = 58.9$ ,  $p = 0.01$ , partial eta squared = 0.41, suggesting a difference in the effectiveness of the two general pedagogical knowledge construction methods. The results also showed a significant effect size. The results highlighted that both groups improved their general pedagogical knowledge of classroom management (see Figure 2). However, those who used Moodle as a construction tool performed significantly better in GPK TESTs than those who were just advised orally.

Table 4. General Pedagogical Knowledge Tests Scores for the Moodle Integrated vs. Traditional Face-to-face Instruction across Three Time Periods

GPK TESTs	Control Group			Experimental Group		
	N	Mean	sd	N	Mean	sd
GPK TEST1	44	60.69	10.77	43	64.28	11.22
GPK TEST2	44	70.52	11.08	43	81.51	9.17
GPK TEST3	44	70.46	7.93	43	81.72	7.54

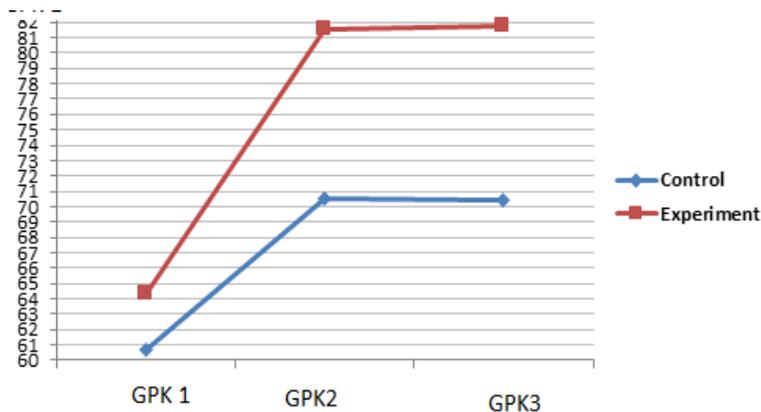


Figure 2. Experimental and Control Group Students' GPK TEST1, GPK TEST2, and GPK TEST3 Scores

As indicated in Figure 2, there is a difference in both groups' GPK TEST1 scores. Compared to placement test scores, the control group students' GPK TEST1 score was below the mean score in the placement test, while there was almost no change for the experimental group. This result may be expected as the students were not informed about the exams. Both groups greatly improved in the second general pedagogical knowledge test (GPK TEST2). Both groups knew they were being studied (Hawthorne effect for the experimental group and John Henry effect for the control group) may influence this improvement in mean scores in GPK TEST2. Finally, both groups' scores in GPK TEST3 were almost the same as GPK TEST2. There was no significant change in scores.

## Discussion

This study analyzed the effectiveness of two different models in constructing general pedagogical knowledge and course performance. Placement and performance tests were used to investigate the effects of Moodle integrated instruction on eighty-seven teacher candidates' performance in the course. Three GPK tests were conducted to reveal the role of Moodle as a tool for constructing general pedagogical knowledge. The experimental group received Moodle integrated instruction, and the control group was given traditional face to face instruction.

The initial findings revealed that both groups showed similar mean scores in the placement test before the intervention began. There was no significant difference in mean scores for the experimental and control groups. However, a one-way between-subjects covariance (placement test as covariance) revealed that Moodle integrated instruction improved participants' course performance significantly than traditional face-to-face methods achieved for the control group participants. These findings supported the findings of Liao & Lin (2011), Martin-Blas & Serrano-Fernandez (2009) Beatty & Ulasewicz (2006), and Seluakumaran *et al.* (2011). Liao & Lin (2011) revealed in their studies on interactive behaviors in a situated internet-supported learning environment that students who participated in Moodle-supported instruction demonstrated significantly better learning outcomes than those who did not. Martin-Blas & Serrano-Fernandez (2009) studied implementing a Moodle platform for an undergraduate online physics course. They found that the online physics course helped students reinforce their abilities and knowledge.

Moreover, they indicated that most of the participants who passed the exam were regular users of Moodle. The qualitative study by Beatty & Ulasewicz (2006) reported positive views about Moodle-supported instruction and stated that Moodle would influence learning and teaching when used effectively. Among the researchers who investigated the effect of Moodle-supported instruction on students' performance was Seluakumaran *et al.* (2011). They revealed that students who participated in Moodle-supported instruction obtained higher scores in final exams than those who did not. Finally, Nunez *et al.* (2011) investigated the effect of a Moodle-based intervention program on tertiary students' study and self-regulation strategies. They revealed that the program improved Moodle users' academic performance and delighted users with using a Moodle platform for teaching. Indeed, the overall improvement in experimental group participants' performance may not be attributed to just using Moodle in instruction. In experimental studies, participants who know that they are being studied may manipulate the results (The Hawthorne effect). Participants were informed that their test results would not be considered official course exams to address this effect. Also, participants were monitored about this effect.

The second aim that guided this study was to determine the effect of Moodle on participants' construction of general pedagogical knowledge in language classrooms. The analysis showed that both groups made improvements on GPK; those who received Moodle integrated instruction showed more significant overall improvement in building GPK than the control group students who were just advised to be ready for the next lesson. The beneficial effects of task-based instruction on constructing general pedagogical knowledge were also revealed by König *et al.* (2011). König *et al.* (2011) used open-response questions when measuring teachers' GPK. The task was built so that based on the situation description, and the respondents had to give supportive feedback and evaluate another future teacher. Within the task-based framework, König *et al.* (2011) put forth that if pre-service teachers showed competency in tasks requiring them to prepare, structure, and evaluate lessons; to motivate and support students and make effective use of time to manage the classroom; to deal with heterogeneous learning groups in the classroom by making use of differentiated strategies and methods of instruction; and to assess students, they acquired the general pedagogical knowledge which is of crucial teacher competence. In this study, Moodle provided a similar task-based learning environment through discussions and case studies launched on modules. In literature, there is a paucity of the effects of digital tools on the constructing general pedagogical knowledge of pre-service teachers, particularly in English language

teaching. In literature, the closest technological application on constructing general pedagogical knowledge was made by König *et al.* (2014), applying video tasks to assess the general pedagogical knowledge development. The study showed the complexity of connecting theoretical knowledge with practical skills. The present study's findings indicated that Moodle integrated learning platform could bridge the theoretical and practical skills to construct the general pedagogical knowledge of pre-service teachers in language classrooms.

The development of GPK through teacher education has been agreed upon by different studies (König, Lammerding, Nold, Rohde, Strauss, & Tachtsoglou, 2016; Merk, Rosman, Rueß, Syring, Schneider, 2018; Malva, Leijen, & Baucal, 2019) so far; these studies have not investigated any instruction modes, particularly technology-integrated learning environments and not many experimental research designs have been applied to assess general pedagogical knowledge, particularly in language classrooms. Thus, this study would contribute to the field and urge more studies on this research topic.

As the emerging conditions point out the necessity of education beyond the wall, this experimental study contributes to how digital tools could improve students' knowledge and performances in the course supported with Moodle. The results in this study underlined that Moodle is an effective way to build general pedagogical knowledge and increase the effectiveness of the instruction. Students who used Moodle were more ready for learning, were more enthusiastic about participating in-class activities, and more successful than the others. Therefore, instructors should be aware of all the functions of Moodle, which provides students with a shared platform for self-learning, self-monitoring, self-modifying, and self-evaluation skills to construct their general pedagogical knowledge.

Finally, several significant limitations need to be considered. Firstly, participants' performances were measured via achievement tests. Observations and open-ended measurement tools would be helpful to understand the effect of Moodle better. Secondly, this study took six weeks. Longitudinal studies would be better to observe the effects of Moodle.

## References

- Arbaugh, J. B. (2000). Virtual classroom characteristics and student satisfaction with internet-based MBA courses. *Journal of Management Education*, 24(1), 32–54.
- Beatty, B., & Ulasewicz, C. (2006). Online teaching and learning in transition: Faculty perspectives on moving from blackboard to the Moodle learning management system. *TechTrends*, 50(4), 36-45.
- Bergeren, A., Burgos, D., Fontana, J. M., Hinkelman, D., Hung, V., & Hursh, A. (2005). Practical and pedagogical issues for teacher adoption of IMS learning design standards in Moodle LMS. *Journal of Interactive Media in Education* (2).
- Brandl, K. (2005). Are you ready to “Moodle”? *Language Learning & Technology*, 9(2), 16-23.
- Bremer, D., & Bryant, R. (2005). A comparison of two learning management systems: Moodle vs Blackboard. *Proceedings of the 18th Annual Conference of the National Advisory Committee on Computing Qualifications*, July 11–13 2005, Tauranga, New Zealand.

- Büyüköztürk, Ş. & Kilic, E. & Akgün, Ö. & Karadeniz, Ş. & Demirel, F. (2018). *Bilimsel Araştırma Yöntemleri*. 10.14527/9789944919289.
- Carvalho, A., Areal, N., & Silva, J. (2011). Students' perceptions of Blackboard and Moodle in a Portuguese university. *British Journal of Educational Technology*, 42(5), 824–841.
- Cejudo, M. D. C. L. (2007). Towards e-learning from free software. Moodle like a Learning Management System (LMS) within reach of all. *Comunicar. Media Education Research Journal*, 15(1).
- Chao, I. T. (2008). Moving to Moodle: Reflections Two Years Later. *Educause Quarterly*, 3, 46-52.
- Ciudad, A. (2010). Teaching innovation and use of the ICT in the teaching-learning process within the new framework of the EHEA, by jeans of Moodle platform. *American Journal of Business Education*, 3(13), 13–19.
- Cole, J., & Foster, H. (2008). *Using Moodle: Teaching with the Popular Open Source Course Management System*. Sebastopol CA: O'Reilly Community Press.
- Doolittle, P. (1999). *Constructivism and online education*. Virginia Polytechnic Institute & State University, Retrieved on 13.01.2013 from <<http://edpsychserver.ed.vt.edu/tohe/text/doo2.pdf>>
- Escobar-Rodriguez, T., & Monge-Lozano, P. (2012). The acceptance of Moodle technology by business administration students. *Computers & Education* (58), 1085–1093.
- Esuzem. (2021). Retrieved from <http://uzemoys.ogu.edu.tr>
- Fer, S., & Cırık, İ. (2007). *Yapılandırmacı Öğrenme: Kuramdan Uygulamaya*. İstanbul: Morpa Yayınları.
- Fillion, G., Limayem, M., Laferrière, T., & Mantha, R. (2007). Integrating ICT into higher education: a study of onsite vs online students' perceptions. *Academy of Educational Leadership Journal*, 11(2), 45–72.
- Godwin-Jones, B. (2003). Tools for distance education: Towards convergence and integration. *Language Learning & Technology*, 7(3), 18-22.
- Guerra, S., González, N. & García, R. (2010). Study on the Use of ICTs as Teaching Tools by University Instructors. *Comunicar*, 35, 141-148.
- Guerriero, S. (Ed.). (2017). *Pedagogical knowledge and the changing nature of the teaching profession*. Paris, France: OECD Publishing.
- Hamid, M. A., Salleh, S. & Laxman, K. (2020). A study on the factors influencing students' acceptance of Learning Management Systems (LMS): A Brunei case study. *International Journal of Technology in Education and Science (IJTES)*, 4(3), 203-217.
- Hanson, P., & Robson, R. (2004) Evaluating course management technology: A pilot study. *Educause Center for Applied Research*, 24, 1-13.
- Imbernón, F., Silva, P. & Guzmán, C. (2011). Teaching Skills in Virtual and Blended Learning Environments. *Comunicar*, 36, 107-114.
- Johnson, R. D., Hornik, S. R., & Salas, E. (2008). An empirical examination of factors contributing to the creation of successful e-learning environments. *International Journal of Human-Computer Studies*, 66, 356–369.
- Kakasevski, G., Mihajlov, M., Arsenovski, S., & Chungurski, S. (2008). Evaluating Usability in Learning Management System Moodle. Interfaces, ITI 2008 30th International Conference on Information Technology, June 23-26, Cavtat, Croatia.

- Keramati, A., Afshari-Mofrad, M., & Kamrani, A. (2011). The role of readiness factors in E-learning outcomes: An empirical study. *Computers & Education*, 57, 1919–1929.
- Kök, A. (2008). An online social constructivist tool: A secondary school experience in the developing world. *Turkish Online Journal of Distance Education*, 9(3).
- König, J., Blömeke, S., Klein, P., Suhl, U., Busse, A., & Kaiser, G. (2014). Is teachers' general pedagogical knowledge a premise for noticing and interpreting classroom situations? A video-based assessment approach. *Teaching and Teacher Education*, 38, 76–88. <https://doi.org/10.1016/j.tate.2013.11.004>
- König, J., Blömeke, S., Paine, L., Schmidt, W. H., & Hsieh, F. J. (2011). General pedagogical knowledge of future middle school teachers: On the complex ecology of teacher education in the United States, Germany, and Taiwan. *Journal of teacher education*, 62(2), 188-201.
- König, J.A., Lammerding, S., Nold, G., Rohde, A., Strauss, S., & Tachtsoglou, S. (2016). Teachers' Professional Knowledge for Teaching English as a Foreign Language. *Journal of Teacher Education*, 67, 320 - 337.
- Lauermann, F. & König, J. (2016). Teachers' professional competence and wellbeing: understanding the links between general pedagogical knowledge, self-efficacy and burnout. *Learning and Instruction*, 45, 9–19. Retrieved from <https://doi.org/10.1016/j.learninstruc.2016.06.006>
- Liao, CW. & Lin, SY. (2011). An analysis of the interactive behaviors of self learnings management in a web-based Moodle e-learning platform. *African Journal of Business Management*, 5(22), 9191-9199.
- Malva, L., Leijen, A. & Baucal, A. (2019). Measuring pre-service teachers' general pedagogical knowledge—What are the results telling? *New Trends and Issues Proceedings on Humanities and Social Sciences*. [Online]. 6(1), pp 135–144. Available from: [www.prosoc.eu](http://www.prosoc.eu)
- Martín-Blas, T., & Serrano-Fernández, A. (2009). The role of new technologies in the learning process: Moodle as a teaching tool in Physics. *Computers & Education*, 52(1), 35-44.
- Merk, S., Rosman, T., Rueß, J., Syring, M., & Schneider, J. (2018). Correction: Pre-service teachers' perceived value of general pedagogical knowledge for practice: Relations with epistemic beliefs and source beliefs. *PLoS one*, 13(2), e0193632. <https://doi.org/10.1371/journal.pone.0193632>
- McGill, T. J. & Klobas, J. E. (2009). A task-technology fit view of learning management system impact. *Computers & Education*, 52(2), 496-508.
- Melton, J. (2006). The LMS Moodle: A usability evaluation. *Languages Issues*, 11/12(1), 1-24.
- Moodle. (2021). <http://www.moodle.org/>.
- Mora Bonilla, A., Sarmiento Moreno, M. D., & Merida Casermeiro, E. (2010). How we can mark the rhythm of the daily work by using a Learning Management System as Moodle? *WSEAS Transactions on Advances in Engineering Education*, 2(7).
- Nunez, J. C., Cerezo, R., Bernardo, A., Rosario, P., Valle, A., Fernandez, E., & Suarez, N. (2011). Implementation of training programs in self-regulated learning strategies in Moodle format: Results of an experience in higher education. *Psicothema*, 23(2), 274-281.
- Payette, D. L., & Gupta, R. (2009). Transitioning From Blackboard to Moodle - Course Management Software: Faculty and Student Opinions. *American Journal of Business Education*, Dec 2(9).
- Rice, W. (2008). *Moodle 1.9 E-Learning Course Development: A complete guide to successful learning using Moodle*. Birmingham: Packt Publishing.

- Rice, W., & Nash, S. S. (2010). *Moodle 1.9 Teaching Techniques*. Birmingham: Packt Publishing.
- Romero, C., Ventura, S., & García, E. (2008). Data mining in course management systems: Moodle case study and tutorial. *Computers & Education, 51*, 368–384.
- Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*(2), 4-14.
- Scott, D. & Usher, R. (2011). *Researching education: Data, methods and theory in educational enquiry*, London: Continuum International Publishing Group.
- Seluakumaran, K., Jusof, F. F., Ismail, R., & Husain, R. (2011). Integrating an open-source course management system (Moodle) into the teaching of a first-year medical physiology course: a case study. *Advances in Physiology Education, 35*(4), 369-377.
- Shen, C. & Liu, H. (2011). Metacognitive skills development: a web-based approach in higher education. *TOJET: The Turkish Online Journal of Educational Technology, 10*(2), 140-150.
- Swan, K. (2001). Virtual interaction: Design factors affecting student satisfaction and perceived learning in asynchronous online courses. *Distance Education, 22* (2), 306-332.
- Ulferts, H (2019) The Relevance of General Pedagogical Knowledge for Successful Teaching: Systematic Review and Meta-Analysis of the International Evidence from Primary to Tertiary Education. Paris: OECD.
- Uribe-Tirado, A., Melgar-Estrada, L.-M., & Bornacelly-Castro, J.-A. (2007). Moodle learning management system as a tool for information, documentation, and knowledge management by research groups. *Profesional de la Información, 16*(5), 468–474.
- West, R. E., Waddoups, G., & Graham, C. R. (2007). Understanding the experiences of instructors as they adopt a course management system. *Educational Technology Research & Development, 55*(1), 1-2.
- Wood, S. L. (2010). Technology for Teaching and Learning: Moodle as a Tool for Higher Education. *International Journal of Teaching and Learning in Higher Education, 22*(3), 299-307.
- Zou, J., Liu, Q., & Yang, Z. (2012). Development of a Moodle course for schoolchildren’s table tennis learning based on Competence Motivation Theory: Its effectiveness in comparison to traditional training method. *Computers & Education, 59*(2), 294–303.

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