Chapter 3
Digital Competencies of Pre-service Teacher Students: Albanian Context

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Abstract The chapter is dedicated to the digital competencies of pre-service teacher students in Albania. Therefore, the level of knowledge and skills of the future generation of teachers. The chapter is composed of two main parts; the first one is about the situation of digital competencies, and the second one is an empirical study focused on Moodle and Microsoft teams' competencies of pre-service teacher students or future teachers. The chapter aims to explore the important policies and results of several policy documents of main Albanian and international institutions focusing on the digital competencies of pre-service teacher students. The chapter also aims to investigate Moodle and Microsoft Teams' key competencies and academic progress through Moodle and Microsoft Team's use. This chapter comprises five sections including (1) Introduction, (2) Theoretical framework and review of literature, (3) Methods, (4) Findings, and (5) Discussion. The introduction begins with the (a) Pre-University Education Strategy, and (b) Albania's Curriculum and Assessment Frameworks. This is followed by (c) School autonomy, (d) Primary and secondary education, and (e) Tertiary education. The theoretical framework and literature review contains (a) Demand for quality teachers (Digital Agenda 2021–2025; Digital Skills in the field of education), (b) ICT use and e-Learning, (c) Digital skills in Albania, and (d) Digital skills during Covid-19 pandemic, (e) Literature review. The empirical study including (a) Methodology, (b) Results (Descriptive analysis, Inferential analysis), and (c) Discussion.

Keywords Digital competence · Pre-service teachers · Moodle competence · Microsoft teams' competence · Academic progress

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3.1 Introduction

3.1.1 Rationale

The chapter entitled “Digital competencies of pre-service teacher students: Albanian Context" is referred to the important policies and results of several policy documents of main Albanian and international institutions focusing on the digital competencies of pre-service teachers’ students. The study also employs the author’s research because of the lack of Measurement and Comparing Digital Competence study in the country.

According to UIS (2020), “Albania is a South-East European country with about 2.8 million people, where about 49% of enrollment in basic education in 2016–2017 was in rural areas. Albania’s current curriculum framework defines the goals, general principles, educational levels, crosscutting key competencies, and subject areas of the pre-tertiary education system. School life expectancy from primary through tertiary education has changed from 10.6 schoolyears in 2000 to 14.8 in 2017, similar to that of neighboring countries, though lower than the average in the EU (17.1 years) and the OECD (17.2 years)” (UIS, 2020).

As SPHERE (2021) pointed out, “Albania has 15 public and 25 non-public universities, and 139,043 students (y. 2018–2019), the most of which are enrolled in public universities (113.277, or 81%). The ICT has been part of curricula in Albania, accompanied by the preparation of the necessary human resources to use it, hence increasing the quality of education. A significant part of the population, main people around 15–25 years old, owns intermediate digital skills, thanks to the knowledge they receive in the education system”.

3.1.2 Albanian Education System

3.1.2.1 The Pre-University Education Strategy

The Albanian Ministry of Education according to MoESY (2016), “steered the preparation of Albania’s current Pre-University Education Development Strategy 2014–2020, which was adopted in 2016. It delineates a vision of the future education and an action with adequate activities, assigned responsibilities, as well as deadlines for implementing change. However, implementation has been relatively weak, in part because individual agencies develop their work plans, which undermines sector-wide planning. In addition, indicators and targets found in the strategy are not aligned with each other, which diminishes the strategy’s ability to drive system improvement.

The Pre-University Education Development Strategy for 2014–2020 delineates main principles for education reform”:

(1) "Qualitative and Inclusive Education: Give students the right to quality in education, equal opportunities to all, as well as the right to be different.
(2) Uniform Education System: In a short time, learning conditions in schools should be comparable to the regional and European educational institutions.
(3) Education for Life: Build the premises for students to learn new knowledge and skills to respond to the country's development and challenges in the labor market.
(4) Quality Assurance of Standards Achievement: The provision of pre-university education is based on western standards and high-quality evaluations.
(5) Decentralization: Creates premises for effective management of a decentralized education system by strengthening the autonomy of schools.
(6) Accountability and Transparency: Improve the legal framework, processes, and procedures needed for accountability and transparency.
(7) Community Support: Arrange financial support from different sources of society to all pre-university education institutions".

According to MoESY (2016), "the strategy also sets the policy priorities for education. For each priority, the strategy sets forth expected results and main activities that will be undertaken. The main priorities are":

(1) "Improving the leadership, and management skills of primary and secondary school resources.
(2) Quality and inclusive learning.
(3) Quality assurance based on western education standards.
(4) Modern teacher training and professional development" (MoESY, 2016).

3.1.2.2 Curriculum and Assessment Frameworks

According to UNESCO (2017), "Albania's current curriculum framework, published in 2014, defines the goals, general principles, educational levels, crosscutting key competencies, and subject areas of the pre-tertiary education system. It sets out a constructivist and student-centered teaching and learning approach and describes the methods teachers should be using in their classrooms, such as formative assessment and portfolio. It sets forth the key competencies for lifelong learning that all students are expected to achieve by the end of upper secondary education, informed by the EU's 2006 Recommendation on Key Competences for Lifelong Learning" (UNESCO, 2017).

According to OECD (2016), "with approval from their local education institutions, schools can draft their curriculum based on the curriculum framework and standards approved by the ministry. Schools in Albania have much greater flexibility in making decisions about curriculum than schools in other Western Balkans countries. Data from "OECD Program for International Student Assessment (PISA) 2015" show that about 79% of the responsibility for curriculum lies at the school level (either teacher, principals, or school boards), a percentage similar to the OECD on average (73%)

and much higher than in Montenegro (34%), North Macedonia (41%) and Croatia (44%)" (OECD, 2016).

UNESCO (2017), pointed out that "Albania's assessment framework builds on the curriculum framework. The framework defines policies and practices such as portfolio assessment, formative assessment, and continuous assessment, though these definitions sometimes lack clarity and concreteness. However, the implementation of many of the processes and activities described in the framework is left to schools, regional directorates, and local education offices, with little additional support or concrete guidance at the national level" (UNESCO, 2017).

3.1.2.3 School Autonomy

As part of its broader decentralization efforts, Albania has taken steps to increase school autonomy, which is one of the general principles of the National Education Law (MoESY, 2012). MoESY (2012) emphasized that "school-level governance in Albania involves school directors along with their substitutes as well as the school boards. According to Albanian law, each school must also have its teacher, parent, and student councils that help shape policies at the school level. For example, schools now play an important role in hiring and dismissing teachers and selecting textbooks. However, the ministry, regional directorates, and local education offices continue to make all decisions related to financial resources, and schools receive no discretionary funding.

At the same time, MoESY (2012) showed that "the ability of schools to reflect on their policies and practices is important for making effective use of school resources, lack of discretionary financial resources notwithstanding. However, the capacity for school planning and self-evaluation remains weak in Albanian schools. Despite guidelines and methodological documents developed by the ministry and the defunct State Education Inspectorate, not all schools understand the legal obligation of conducting self-evaluations, and many view this task as a formal bureaucratic exercise" (MoESY, 2012).

3.1.2.4 Primary and Secondary Education

According to UIS (2020), "the school life expectancy from primary through tertiary education has increased from 10.6 schoolyears in 2000 to 14.8 in 2017, similar to that of neighboring countries like Serbia (14.7 years) and Montenegro (15.0 years), though lower than the average in the EU (17.1 schoolyears) and the OECD (17.2 schoolyears)" (UIS, 2020). As MoESY, reported "about 49% of enrollment in basic education in 2016–2017 was in rural areas, as compared to 54% in 2006–2007". According to OECD (2018), "in rural areas public basic education there are about 17 students per class, as compared to about 21 students per class on average across all Albanian public basic education. However, about 27% of classrooms in Albania had over 30 students in 2015–2016, and overcrowding is of particular concern in

urban centers (UNESCO, 2017). Some teachers have reported class sizes of over 40 students, beyond the legal limit. In OECD countries, the average class size is about 21 and 23 for primary and lower secondary schools respectively" (OECD, 2018).

As MoESY, indicated, "the student-to-teacher ratio in public basic education is smaller in rural areas, about 11, as compared to a national average of about 14". Meantime, according to OECD (2018), "at the high secondary education, the student per teacher ratio in public schools is also lower in rural areas (about 13) than on average in Albania (about 14). In OECD countries, the ratio of students to teaching staff is 15 across all primary schools, 13 in public lower secondary schools, and 13 overall" (OECD, 2018).

As UNESCO (2017), indicated, "several features of the basic school system in Albania stand out when compared with school networks in most OECD and EU countries. These include the relatively large number of students enrolled in multi-shift schools (12%) and multi-grade classrooms (10%)" (UNESCO, 2017). At the same time, "recent national data indicate that about 22 000 students attend a multi-grade classroom, which is a concern in terms of equity. Multi-grade classrooms have lower levels of reading and writing skills and have faced particular challenges in implementing the competency-based curriculum" (UNESCO, 2017). According to AQAPUE (2014, 2018), "the Ministry of Education defines the percentage of learning time during each curriculum stage, which spans multiple grade levels, and the percentage of instructional time per week that should be dedicated to each subject area. Lessons are mandated to be 45 min long" (AQAPUE, 2014, 2018).

3.1.2.5 Tertiary Education

Albania has 15 public and 25 non-public universities, and a total of 139,043 students (y. 2018–2019), most of them enrolled in public universities (113.277, or 81%) (SPHERE, 2021). According to OECD (2020), "Albania has made significant progress in developing a multi-party democracy and open market economy, evolving from one of the poorest countries in Europe into an increasingly competitive, upper-middle-income economy. As part of this process, Albania has embarked on significant education reforms such as the decentralization of school governance and the introduction of a competency-based curriculum. This has contributed to improvement across key education indicators. However, the majority of Albanian students continues to end universities without mastering basic skills and competencies. Equity is also a concern, with continued disparities in educational opportunities and outcomes according to ethnic background and geographical region" (OECD, 2020).

According to Bekteshi (2015), "there were only 14,000 university students in Albania up until 1990, meantime, capacities were limited. Admissions at universities were limited and controlled, and not all secondary school students who wanted to attend them were accepted. The plural democratic system after 1990 also brought the increase in capacities and admissions as well as the opening of new universities. The great quantitative changes happened in 2005 when admission capacities went up to

52,000, and 175,000 students in 2014. There were also qualitative changes during this period, the most important of them was the participation of Albania in the Bologna Process in 2003. Bologna participation was accompanied by the restructuring and upgrading of the study programs, as well as adaptation of the university curricula to the Bologna system, and the concept of ECTS" (European Credits Transfer System) (Bekteshi, 2015).

However, as UIS (2020), indicated, "after a consistent increase since 1991, the gross enrollment ratio in tertiary education has fallen from 66% in 2014 to 55% in 2018. This is in part due to the closure of private universities awarding a high volume of reportedly low-quality degrees, as well as migration outflows are driven by the pursuit of education and career opportunities abroad" (UIS, 2020).

As Council of Ministers of Albania, as well as MoESY, "in 2016, a new higher education law provided greater flexibility on the use of the State Matura examination as the basis for entry into higher education programs. While students must still achieve a minimum score based on a formula weighting set by the Council of Ministers, universities are allowed to develop their publicly available criteria, set quotas, and conduct their ranking of applicants" (Albanian Academic Network, 2020). As Bekteshi (2015), showed, "the use of additional criteria by universities has thus far been limited, and there are mixed views among universities as to whether adding criteria will make schools less competitive in enrolling students or, by setting higher expectations, increase the quality of candidates" (Bekteshi, 2015).

3.2 Theoretical Framework and Literature Review

3.2.1 Demand for Quality Teachers

According to MoESY, "Albania has engaged in several important efforts to improve the quality of teaching. These include raising entry requirements and moving toward the standardization of curriculum content for certain initial teacher education programs, updating teaching standards, implementing a state exam for new entrants to the teaching profession, and setting up professional learning networks. In addition, the percentage of teachers that have attained some level of higher education has increased from two-thirds of teachers in 2006–2007 to 91% in 2016–2017". OECD, pointed out that, "however, data from the OECD Teacher and Learning International Survey (TALIS) indicate that this percentage is below the average across participating countries and economies in the OECD (98%) and the EU" (98%). Meantime, Echazarra and Radinger (2019), emphasized that, "moreover, there remain concerns about the quality of teachers, particularly in rural and disadvantaged areas. As reported by principals in the PISA 2015 survey, the gap in the quality and quantity of teaching staff between rural and urban schools is particularly large in Albania, and Albania is one of only ten countries and economies where the quality of teaching staff is of greater concern among rural school principals than among city school principals"

(Echazarra & Radinger, 2019). At the same time, according to UNESCO (2017), "economically disadvantaged areas of Albania also have greater difficulty finding quality teachers, in part due to migration into urban areas" (UNESCO, 2017).

3.2.2 ICT Use and e-Learning

According to Bekteshi (2015), "part of the strategies of the Albanian government for higher education is the strategies for the development and mass use of ICT and e-Learning as very important means of support to the teaching and learning process in universities. The need for the mass use of ICT in Albanian universities is immediate, and some of the following are stimulating factors". First, "the assessment criterion of a university is its competitiveness toward the other universities, for which the assessing or leading boards should obtain academic, pedagogic, and administrative information. Second, the ever-increasing amount or numbers of data and information, the complexity of the problems accompanying higher education, and the number of students and lecturers require the use of an information system for their full management. Third, the increase of transparency of actions related to the administration of data on students, academic staff, lecture times, literature, taxes and financial obligations of the students, etc. Fourth, the increase of teaching and reading quality, as well as the improvement of student administration quality-from the moment they enroll at university, attendance of academic programs, gradual assessment, up to the completion of their academic programs. Fifth, having all the data in one central database, and the understanding and easy use of the information system by the users: students, lecturers, and administration staff" (Bekteshi, 2015).

As Bekteshi (2015, point out, "many public and private universities in Albania consider the e-Learning platform as an indispensable addition to their normal infrastructure. E-Learning is being used by Albanian universities as an indispensable factor characterized by the elimination of the time and geographic barriers between students and lecturers, increases the interaction between them, and affects the quality of teaching and learning process in universities. The ICT has been included in curricula in Albania, accompanied by the preparation of the necessary human capital to use it, thus increasing the possibilities to read and increase the quality of education. Initiatives coming by both the government and universities consist in information services, professors' capacity building, infrastructure, content development, and organizational structures" (Bekteshi, 2015).

3.2.3 Digital Skills in Albania

Demand for digital skills in Albania nowadays is getting much more attention by key stakeholders, as well as by the entire society. Demand for digital skills in Albania is related to both digital skills as a key competence and specialized digital skills related

to specific occupations. The current demand for digital skills in Albania is linked to the changes that the economy is undergoing and the desire of society to move closer to digitalization. In an increasingly digital world, Albania, as a middle-income country, has high demands for digital skills development but few opportunities to acquire these skills. The majority of society owns basic digital skills and technical competence, such as using electronic products, software programs, social media, and making easy online transactions such as searching on the internet and sending and receiving emails. A significant part of the population, main people around 15–25 years old, owns intermediate digital skills, thanks to the knowledge they receive in the education system. On the other hand, only people who have completed university studies and people who work in the growing digital sector itself possess more advanced skills (Haxhi, 2021).

3.2.3.1 Digital Agenda 2021–2025

The Albanian Government has designed a digital agenda that includes the period 2021–2025. The main guidelines of the Albanian Government Digital Agenda 2021–2025 include further development of the information society and promotion of the economy, culture, and digital tourism, through further development of e-Government, promoting and enabling the digital economy, culture, and tourism, as well as improving cybersecurity and trusted services. Digital Agenda 2021–2025 include also the development of national electronic communications infrastructure and regulations in the field of audiovisual media, enabling and developing basic and advanced digital skills to broadly involve the population in ICT services and increase ICT professionals, and policy development and piloting, testing and experimentation in new ICT Fields (Haxhi, 2021).

3.2.3.2 Digital Skills in the Field of Education

Digital Skills in the field of education, including steps for the future in pandemic circumstances, are shown in the shape of short-term objectives, as well as medium-term objectives. Short-term objectives in the field of education in Albanian, as shown below represent three main directions. First is the identification and promotion of good e-learning practices that include effective or appropriate online platforms for interactive learning to take place. Second is the increasing the capacity of online teaching through. The second direction includes (a) training teachers for the use of online platforms or adoption with the distance learning methods of teaching or adaptation of the curriculum for online teaching equipment with digital tablets of pre-university students, (b) preparing or designing user-friendly guides for teachers and students and make it easier for students to use online learning platforms, (c) equipping pre-university students with digital tablets or internet sticks, especially those in distant areas where there is no internet coverage, as well as (d) adaptation of legislation regarding digital skills, that is foreseen also in the new Strategy for

Education. Third, is the regional cooperation, which includes (a) digitalization of the Higher Education system- implementation of blockchain technology for automatic recognition of qualifications, and (b) regional digital competition on digital smart solutions (Haxhi, 2021).

Meanwhile, medium-term objectives as shown below represent five other main directions. First is an investment in digital infrastructure for supporting e-learning, to ensure high speed and very high connectivity to make possible the quality learning, as well as increasing e-skills mainly for micro-businesses that operating in remote areas of Albania. Second is the investments in digital skills for the digital economy, through increasing the digital skills of small and medium-sized enterprises, thereupon, the focus can be on e-commerce, as functional e-commerce practices, support to increase the digital skills of businesses, assistance for the legal framework for the provision of online services, and design a guide to educate the public on how to stay safe when shopping online. The third is to design and approve a comprehensive digital skills strategy. Fourth is the establishment of a Regional Digital Transformation Academy related to the development of digital skills for the labor force or small and medium-sized enterprises and the digital economy. Fifth is the support to introduce Micro-Credentials—a new flexible and alternative pathway of learning in Higher Education (Haxhi, 2021).

3.2.4 Digital Skills During Covid-19 Pandemic

According to SPHERE (2021), "like many other countries in the world, Albania today is facing until now the Covid-19 pandemic situation. Considering and analyzing the Covid-19 situation, the Ministry of Education suggested to universities to consider online learning and teaching as an alternative. MASR proposed to each university to set up a working group of lecturers that piloted and tested different platforms that could be used by each institution. Academic senates, after having evaluated the situation, decided to switch to online learning and teaching as fast as possible. There were some difficulties during the preparatory phase, such as IT infrastructure preparation, student database development, and the preliminary assessment of how to prepare didactic materials. However, they were quickly overcome. In a relatively short period and with great motivation, the academic staff, the governing bodies, and the administrative staff of the Albanian Universities created online platforms for the students using Google Classroom, Moodle, Zoom, Google Meet, Microsoft Teams, etc. Through those platforms, didactic materials were made available for all study programs at the bachelor's and master's levels" (SPHERE, 2021).

As SPHERE (2021) emphasized, "regarding other elements of teaching, universities were working to solve the issues they have encountered for other academic activities such as laboratories, professional practices, or other activities that need physical participation. The percentage of online students during a usual day of the week is about 85%. At this moment, all academic activities are performed online except fieldwork and professional practices. Laboratory classes are recorded by the lecturer

in 'Screen Rec' and then shared with students. The second part of lab classes is organized based on discussions, questions, and answers. In some subjects, virtual labs have been executed by staff and students. This process has entailed some difficulties during the first week, such as missing digital equipment or faulty internet connection. The universities assisted the staff and students by making available manuals and video tutorials for the use of digital platforms" (SPHERE, 2021).

As SPHERE (2021) showed, "it is hoped that online teaching will continue to improve: The quality of the group assignments given to students should be improved to encourage the cooperation of students outside the classroom. The discussion that promotes the development of critical thinking should also be stimulated. Students should be guided between the interactive learning of projects, case studies, and learning through inquiry and research-based learning, connecting these different means in the pursuit of completing student learning outcomes. Students should be motivated to give thoughtful answers to the questions that arise from observing online laboratory sessions to enable a deeper understanding of processes. Performing online exams through different platforms have been proposed as an alternative to the traditional examination ways".

"Universities have identified cases where students have faced difficulties (mainly internet access and performance, home conditions, etc.) and staff is working to guarantee the due support. Being aware of the situation of the Covid-19 crisis, but also in compliance with academic standards of teaching, universities' governing bodies are monitoring the development of the teaching process over the respective online platforms. The main purpose of this monitoring process is to guarantee access to all students and make the improvements needed to the relevant infrastructure" (SPHERE, 2021). According to SPHERE (2021), "the implementation of digital teaching in Albania following the Covid-19 situation shows that academic staff has been adapting quickly to this new mode of teaching, although some shortcomings need to be addressed. This new experience for universities has led the academic staff to face not only barriers but also to identify the need for better digital skills and competencies by introducing new methodologies and technologies in teaching and learning. This experience is expected to affect a large number of universities, and encourage increasing, in the future, not only investments in the area of ICT in teaching and learning but also to strengthen the professional development of staff through training related to digital technology and teaching methods" (SPHERE, 2021).

3.2.5 Literature Review

Many authors have done a lot of research on digital skills and competencies of future education and teachers themselves. "Shrinking budgets, innovations in technology, and staff changes each cause organizations to ask traditionals and can enhance managers to use new ways of thinking to support workflow and to answer evolving university initiatives. To manage the knowledge has also emerged as one such way of

thinking about management challenges" (Shropshire et al., 2019). At the same time, Shehata et al. (2020) in their study indicate that "the academic staff level of preparedness for online teaching and learning was evaluated as medium to high and effective leadership support was reported by 70% of them. Academic staff reported diverse views about the proper role of education units, and 64.1% of the participants identified knowledge and skills teaching challenges, meanwhile, 76.3% of them reported the absence of alternative approaches for final assessment. In conclusion, lectures themselves moved faster than managers and relied on support existing outside the universities when the situation happened" (Shehata et al., 2020). Meanwhile, Neuwirth et al., 2020 showed that "the coronavirus (COVID-19) pandemic situation has required to faculty and students to adapt to an unprecedented challenge and rapidly transition from traditional face-to-face teaching to distance instruction formats through virtual learning. While most universities trained academic staff to ensure quality and maintenance of the curriculum through virtual teaching, less support has been given to training students, who face equal and in some cases even more challenges in adapting to this fast change in the delivery of the online curriculum. Less support has been developed for students to facilitate their involuntary transition to virtual teaching and maintenance of adequate online learning behaviors. Building a significant dialogue between academic staff, who are engaged in efforts to cope and adapt to the pandemic, may be useful in re-envisioning and re-designing future curriculum. This process may facilitate future procedures on creating best practices guidelines for asynchronous/synchronous virtual teaching post pandemic" (Neuwirth et al., 2020).

Jones et al. revealed that "due to the COVID-19 pandemic situation, worldwide universities have curtailed face-to-face teaching. At the same time, academic staff has to do the delivery of the practical experience required of students. Of course, practical skills and competences cannot be easily provided with the recording laboratory experiences and putting videos, quizzes, and data online for students to work with. Meanwhile, it is an effective way of putting students to work with real data, uncertainty, and equipment which they cannot access in direct way. Several short case studies are provided to inspire and support other educators in how they can use effective online experiments. Anecdotal evidence suggests that this approach is at least acceptable for students". "Universities and Colleges in the United States are using Open Sources software applications such as the Moodle and Sakai course management systems and the Kuali financial system to create integrated learning environments that serve both lectures and students' needs. Open Source is meant to be more flexible and less costly than commercial software, and support creating a balance between sound pedagogy and business efficiencies" (Williams & van Rooij, 2017). "The impact of the ongoing digital innovation has been profound and has been studied in many ways such as faculty interaction with the students, e-participation. However, the research of how the digital innovation has changed faculty interactions with students via information and communication technologies (ICTs) has been modest, and the theory constructing in research studies has been, for the most part, modest too. A major reason for this lack of progress is the inability to produce an operational definition of e-leadership that spans telework, team, and enterprise settings" (Wart et al., 2017).

Dalziel (2011) pointed out that "e-learning has considerable potential for education, but there is a need to move beyond individual, self-paced views of e-learning to appreciate its full potential. Learning Design provides a framework for describing and freely sharing effective teaching ideas, building on other Internet-based sharing approaches such as open-source software and open content. The Learning Activity Management System (LAMS) is a Learning Design system that allows lecturers to author and share learning designs, as well as run them with students and assess their progress" (Dalziel, 2011). Wireless sensor networks "according to Kim et al. (2011)" include a wide range of potential applications to increase the quality of instruction and academic progress in an all-over learning environment. Wireless sensor networks become an evolving technology that acts as the ultimate interface between the students and the context, enhancing the interactivity and improving the acquisition of students' contextual knowledge. The u-learning model is a web-based e-learning system utilizing various state-of-the-art features of wireless sensor networks that could enable students to acquire knowledge and skills through interaction between them and the all-over learning environment. It is based on the theory of connectivism which confirms that knowledge and the learning of knowledge and skills are distributive and are not located in any given place but rather consist of the network of connections that is formed from experiences and interactions between lecturers and students. The communication between devices and the embedded computer in the environment supports students to learn in an environment of their interest while they are moving, hence, attaching them to their learning environment" (Kim et al., 2011). "Computational thinking contains concepts that are essential to communication and information technology to solve different problems, to design and evaluate different systems, and to answer student reasoning and behavior. Computational thinking has important implications in information and communication technology, as well as in almost every other field. Hence, it is suggested that computational thinking should be taught in elementary schools and included in every university's curriculum" (Flórez et al., 2017).

Hollyhead et al. (2012) used grounded theory "to examine the function and application of both lecturer-led and student-led forums within a virtual learning environment of a university or college. Differences between academic staff are identified, including those relating to the type, frequency, and breadth of forum usage. The findings suggest that students' voluntary use of Social Network Sites as a complement to formal learning is socially embedded at the university and build a widely accepted integral part of the learning experience. This rapidly evolving usage of forums could present future challenges for lecturers, not least because of Social Network Site-hosted learning materials and patterns may be obscured from them" (Hollyhead et al., 2012). Joshi et al. (2016) indicated that "while effective knowledge and skills management has been acknowledged as the key driver for new knowledge and skills, the fact that academics still write about it and organizations are actively go after the concept means that effective knowledge and skills management is going to continue in future" (Joshi et al., 2016).

Wan and Nicholas (2010) in their research demonstrate that "online support for students with high ability is possible as well as practical. Online support requires a

structured approach to move the students in a progressive way to more open-ended inquiry. Applying this approach decrease the extent of student drop-out and improves task completion when compared to more challenging open-ended tasks. Lecturers or universities seeking to provide this kind of support to overcome local isolation of students with high ability. It is suggested to design the structured engagement with topics and with other students, to remain closely involved in the initial stages of engagement and only gradually remove their scaffolding as students demonstrate the capacity to sustain independent interactions" (Wan & Nicholas, 2010). "For some schools, using iPads instead of computer labs can be a cost- and space-saving endeavor, and attitudes toward tablets did not change but confidences did, particularly in document design" (Watkins et al., 2019). Boling and Beatty (2010) reveal that "online discussion forums can provide an excellent medium where students analyze models of writing, engage in the writing process, and monitor, reflect upon, and discover expert strategies in context. They also show that both the quantity and quality of computer-mediated feedback increased over time, resulting in students learning not only from their teacher but from each other" (Boling & Beatty, 2010). MacLeod et al. (2018) found "a positive association between student-to-student connected classroom climate and the benefits of student integration, learning, and retention in face-to-face environments. They also provide empirical evidence of the relationships between key technological factors and connected classroom climate in cloud classrooms. Main technological variables examined were positively associated with connected classroom climate: advanced computer self-efficacy, software computer experience, internet computer experience, and computer importance" (MacLeod et al., 2018). Hence, as the above work pointed out, digital competence is very important to in-service teachers, because the future work of teaching is very challenging.

3.3 Methodology

The empirical study aims to investigate the relationships between Moodle and Microsoft Teams' key competencies and academic progress through Moodle and Microsoft Team's use. Therefore, the two main research questions are provided below. What is the perceived level of Moodle and Microsoft Teams digital literacy of pre-service teacher-student? Do Moodle and Microsoft Teams' key competencies predict academic progress through Moodle and Microsoft Teams use?

3.3.1 Defining Digital Competence

According to Julien (2018), "digital literacy, a term which emerged in the '90 s and was popularized by Gilster (1997); (McArthur et al., 2018), refers on the one hand, to a set of skills, attitudes, and knowledge needed to access digital information effectively, efficiently, and ethically'" (Julien, 2018, cited by Peled). "On the other

hand, it stresses the digital tools available to communicate with others, to create meaning, and to evaluate digital content" (Neumann et al., 2017). As McArthur et al. (2018) pointed out, "some educational researchers identify digital literacy by categorizing its skills into information access, online participation, computer ability, search engine skills, and skills required to evaluate found information" (McArthur et al., 2018). "Others divide the digital skills into operational, mobile, navigation, social, and creative domains" (Peromingo & Pieterson, 2018, cited by Peled).

Therefore, the definition of Moodle and Microsoft Teams competencies employed for the empirical study is the confidential, critical and creative use of Moodle and Microsoft Teams to achieve a high level of academic performance, as well as to achieve life skills in work, inclusion, and contribution in society.

3.3.2 Method and Design

The quantitative approach was the method selected to be used in the study. The research design of the study employed a sample of 239 pre-service teacher students. Moodle and Microsoft Teams' key competencies were selected to be used as independent variables; meanwhile, academic progress through Moodle and Microsoft Teams use were selected as dependent variables. Moodle and Microsoft Teams' key competencies, as an independent variable have fore levels: 1 = never, 2 = sometimes, 3 = frequently, 4 = always. Meanwhile, academic progress through Moodle and Microsoft Teams, as dependent variables have also fore levels: 1 = low, 2 = medium, 3 = high, and 4 = very high.

3.3.3 Sample and Data Collection

A non-random sample of 239 pre-service teacher students was selected to be investigated in the research. The sample of respondents is composed of 144 females (60.3%), and 95 (39.7%) males. A structured questionnaire was used to gather the primary data from the students in the 2020–2021 academic year. The questionnaire is based on Self-Report Digital Literacies (SRDL) (Peled, 2021) and is modified, piloted, and validated by the author.

3.3.4 Hypothesis

Based on theoretical framework and literature review, the main hypothesis of the study is shown below.

H #: Moodle and Microsoft Teams' use predict academic progress through Moodle and Microsoft Teams' use by the pre-service teacher students.

The main hypothesis is split up into three specific hypotheses as follows.

H # 1: The variance in academic progress through Microsoft Teams' use is explained by lecture attendance through Microsoft Teams' use.

H # 2: The variance in academic progress through Microsoft Teams' use is explained by seminar attendance through Microsoft Teams' use.

H # 3: The variance in academic progress through Moodle's use is explained by Moodle's use.

3.3.5 Analysis

The frequency values, as well as, central tendency values were used to describe the Moodle and Microsoft Teams' key competencies and academic progress through Moodle and Microsoft Teams use. Pearson product-moment correlation coefficient was used to investigate the relationship between Moodle and Microsoft Teams' key competencies and academic progress through Moodle and Microsoft Teams use. Linear multivariate regression was used to investigate the ability of one control measure to predict academic progress through Moodle and Microsoft Teams used by Moodle and Microsoft Teams key competencies. Preliminary assumption testing was made to check for normality, linearity, outliers, homogeneity of variance–covariance matrices, and multicollinearity, with no violations noted (Table 3.1).

Table 3.1 Frequencies of Moodle lecture and Moodle exercises download competence

		Moodle lecture download competence		Moodle exercises download competence	
		Frequency	Percent	Frequency	Percent
Valid	Never	24	10	19	7.9
	Sometimes	27	11.3	38	15.9
	Frequently	103	43.1	93	38.9
	Always	84	35.1	88	36.8
	Total	238	99.6	238	99.6
Missing	System	1	0.4	1	0.4
Total		239	100	239	100

3.4 Results

3.4.1 Descriptive Results

3.4.1.1 Moodle Lecture Download Competence

Moodle Lecture Download competence frequencies indicate that 21.3% of the respondents claim that they never or sometimes download lectures from Moodle; meanwhile, 78.2% of them claim frequently or always. Central tendency values for the respondents (M = 3.352; SD = 0.0718), showed the same tendency for values as measured by frequencies. Hence, there are differences between the low levels of download lectures values (never or sometimes: 21.3%), and the high levels (frequently or always: 78.2%). Therefore, the most of students (78.2%) claim that they download lectures from Moodle most frequently or always during the academic year.

Moodle Exercises Download competence frequencies revealed that 23.8% of the respondents claim that they never or sometimes download exercises or other supporting material from Moodle; meanwhile, 85.7% of them claim frequently or always. Central tendency values for the respondents (M = 3.260; SD = 0.0810) mean the same tendency for values as measured by frequencies. Hence, there are differences between the low levels of exercises or other supported material values (never or sometimes: 23.8%), and the high levels (frequently or always: 85.7%). Therefore, the most of students (85.7%) claim that they download exercises or other supporting material from Moodle most frequently or always during the academic year (Table 3.2).

Table 3.2 Frequencies of Lecture attendance and Seminar attendance through Microsoft Teams

		Lecture attendance through Microsoft Teams		Seminar attendance through Microsoft Teams	
		Frequency	Percent	Frequency	Percent
Valid	Never	11	4.6	14	5.9
	Sometimes	21	8.8	28	11.7
	Frequently	51	21.3	75	31.4
	Always	155	64.9	121	50.6
	Total	238	99.6	238	99.6
Missing	System	1	0.4	1	0.4
Total		239	100	239	100

Table 3.3 Frequencies of Moodle use and Microsoft Teams use competence

		Moodle use competence		Microsoft Teams use competence	
		Frequency	Percent	Frequency	Percent
Valid	Never	11	4.6	11	7.1
	Sometimes	42	17.6	42	8.8
	Frequently	36	15.1	36	22.6
	Always	149	62.3	149	61.1
	Total	238	99.6	238	99.6
Missing	System	1	0.4	1	0.4
Total		239	100	239	100

3.4.1.2 Lecture and Seminar Attendance Through Microsoft Teams

Lecture attendance through Microsoft Teams frequencies revealed that 13.4% of the respondents claim that they never or sometimes attended lectures through Microsoft Teams; meanwhile, 86.2% of them claim frequently or always. Central tendency values for the respondents (M = 3.916; SD = 0.402), showed the same tendency for values as measured by frequencies. Hence, there are huge differences between the low levels of lecture attendance through Microsoft Teams values (never or sometimes: 13.4%), and the high levels (frequently or always: 86.2%). Therefore, the most of students (86.2%) claim that they attended lectures through Microsoft Teams most frequently or always during the academic year.

Seminar attendance through Microsoft Teams frequencies showed that 17.6% of the respondents claim that they never or sometimes attended seminars through Microsoft Teams; meanwhile, 82.4% of them claim frequently or always. Central tendency values for the respondents (M = 3.857; SD = 0.516), revealed the same tendency for values as measured by frequencies. Hence, there are considerable differences between the low levels of seminar attendance through Microsoft Teams values (never or sometimes: 13.4%), and the high levels (frequently or always: 82.4%). Therefore, the most of students (82.4%) claim that they attended seminars through Microsoft Teams most frequently or always during the academic year (Table 3.3).

3.4.1.3 Moodle and Microsoft Teams Easy Use Skill

Moodle use competence frequencies indicate that 22.2% of the respondents claim that they never or sometimes use Moodle; meanwhile, 77.4% of them claim frequently or always. Central tendency values for the respondents (M = 3.579; SD = 0.717) show the same tendency for values as measured by frequencies. Hence, there are differences between the low levels of using the Moodle easy values (never or sometimes: 22.2%), and the high levels (frequently or always: 77.4%). Therefore, most students (77.4%) claim that they use Moodle most frequently or always during the academic year.

Table 3.4 Frequencies of easy tests access in Moodle and Microsoft Teams skill

		Test access in Moodle competence		Test access in Microsoft Teams competence	
		Frequency	Percent	Frequency	Percent
Valid	Never	12	5	12	5
	Sometimes	21	8.8	27	11.3
	Frequently	73	30.5	72	30.1
	Always	132	55.2	127	53.1
	Total	238	99.6	238	99.6
Missing	System	1	0.4	1	0.4
Total		239	100	239	100

Microsoft Teams use competence frequencies reveal that 15.9% of the respondents claim that they never or sometimes use the Microsoft Teams; meanwhile, 83.7% of them claim frequently or always. Central tendency values for the respondents (M = 3.810; SD = 0.461) mean the same tendency for values as measured by frequencies. Hence, there are considerable differences between the low levels of using the Microsoft Teams easy values (never or sometimes: 15.9%), and the high levels (frequently or always: 77.4%). Therefore, the most of students (83.7%) claim that they use Microsoft Teams most frequently or always during the academic year (Table 3.4).

3.4.1.4 The Middle and Final Term-Test Took Online

Tests access in Moodle competence frequencies indicate that 13.8% of the respondents claim that they never or sometimes access the tests easily in the Moodle; meanwhile, 85.7% of them claim frequently or always. Central tendency values for the respondents (M = 3.567; SD = 0.650), revealed the same tendency for values as measured by frequencies. Hence, there are differences between the low levels of easy test access in Moodle values (never or sometimes: 13.8%), and the high levels (frequently or always: 85.7%). Therefore, most students (85.7%) claim that they access the tests easily in Moodle most frequently or always during the academic year.

Tests access in Microsoft Teams competence frequencies indicate that 16.3% of the respondents claim that they never or sometimes access the tests easily in the Microsoft Teams; meanwhile, 83.2% of them claim frequently or always. Central tendency values for the respondents (M = 3.680; SD = 0.550) show the same tendency for values as measured by frequencies. Hence, there are differences between the low levels of test access in Microsoft Teams values (never or sometimes: 16.3%), and the high levels (frequently or always: 83.2%). Therefore, the most of students (83.2%) claim that they access the tests in Microsoft Teams most frequently or always during the academic year (Table 3.5).

Table 3.5 Frequencies of Academic progress through Moodle and Microsoft Teams use frequencies

		Academic progress through Moodle use		Academic progress through Microsoft Teams use	
		Frequency	Percent	Frequency	Percent
Valid	Low	32	13.4	31	13.0
	Medium	47	19.7	30	12.6
	High	104	43.5	69	28.9
	Very high	55	23.0	108	45.2
	Total	238	99.6	238	99.6
Missing	System	1	0.4	1	0.4
Total		239	100.0	239	100.0

3.4.1.5 Academic Progress Through Moodle Use and Microsoft Teams Use

Academic progress through Moodle use frequencies indicates that 13.4% of the respondents achieved a low or medium level of academic progress through Moodle use; meanwhile, 86.2% of the high or very high level. Central tendency values for the respondents (M = 3.016; SD = 0.880) show the same tendency for values as measured by frequencies. Hence, there are differences between the low or medium levels of academic progress through Moodle use values (33.4%), and the high or very high levels (66.5%). Therefore, most students (66.5%) claim that they achieved high or very high levels of academic progress through Moodle use during the academic year.

Academic progress through Microsoft Teams use frequencies show that 25.6% of the respondents achieved a low or medium level of academic progress through Microsoft Teams use; meanwhile, 74.4% of the high or very high level. Central tendency values for the respondents (M = 3.424; SD = 0.909), reveal the same tendency for values as measured by frequencies. Hence, there are considerable differences between the low or medium levels of academic progress through Microsoft Teams use values (25.6%), and the high or very high levels (74.4%). Therefore, most students (74.4%) claim that they achieved high or very high levels of academic progress through Microsoft Teams use during the academic year.

3.4.2 Inferential Analyses

H # 1

As shown in Table 3.6, there is a relatively positive high correlation between lecture attendance through Microsoft Teams and academic progress through Microsoft

Table 3.6 Pearson correlation outputs of the relationship between lecture attendance through Microsoft Teams use and academic progress through Microsoft Teams use

Correlations			
		Academic progress through Microsoft Teams use	Lecture attendance through Microsoft Teams use
Pearson Correlation	Academic progress through Microsoft Teams use	1.000	0.619
	Lecture attendance through Microsoft Teams use	0.619	1.000
Sig. (1-tailed)	Academic progress through Microsoft Teams use		0.000
	Lecture attendance through Microsoft Teams use	0.000	
N	Academic progress through Microsoft Teams use	238	238
	Lecture attendance through Microsoft Teams use	238	238

Teams use variables, $r = 0.619$, $n = 238$, $p > 0.005$. Hence, high scores of lecture attendance through Microsoft Teams are associated with high scores of academic progress through Microsoft Teams use (Table 3.7).

The R2 value of the relationships between lecture attendance through Microsoft Teams and academic progress through Microsoft Teams use is 38.3%, F (1, 0.383), $p < 0.005$. This result indicates that 38.3% of the data according to fit the regression model. The model gets statistical significance (Sig. = 0.000; this means $p < 0.0005$).

As shown in Table 3.8, the beta value for academic progress through Microsoft Teams use is 0.619. The result means that 61.95% of the variance on academic progress through Microsoft Teams use is explained by lecture attendance through Microsoft Teams use. Based on statistical outputs shown above, H # 1: The variance in academic progress through Microsoft Teams use is explained by lecture attendance through Microsoft Teams use, which is supported (Table 3.9).

H # 2

As shown in Table 3.9, there is a relatively low positive correlation between seminar attendance through Microsoft Teams and academic progress through Microsoft Teams use variables, $r = 0.279$, $n = 238$, $p > 0.005$. Hence, high scores of seminar attendance through Microsoft Teams are associated with high scores of academic progress through Microsoft Teams use (Table 3.10).

Table 3.7 R Square value of the relationship between lecture attendance through Microsoft Teams use and academic progress through Microsoft Teams use

Model summary									
Model	R	R square	Adjusted R square	Std. error of the estimate	Change statistics				
					R square change	F change	df1	df2	Sig. F change
1	0.619[a]	0.383	0.381	0.82460	0.383	146.803	1	236	**0.000**

[a] Predictors: (Constant), Lecture Attendance through Microsoft Teams

Table 3.8 Standardized Coefficients Beta values of the relationship between lecture attendance through Microsoft Teams use and academic progress through Microsoft Teams use

Coefficients[a]									
Model		Unstandardized coefficients		Standardized coefficients	t	Sig	Correlations		
		B	Std. error	Beta			Zero-order	Partial	Part
1	(Constant)	0.577	0.211		2.730	0.007			
	Lecture attendance through Microsoft Teams	0.742	0.061	0.619	12.116	0.000	0.619	0.619	0.619

[a] Dependent Variable: Academic progress through Microsoft Teams use

Table 3.9 Pearson correlation outputs of the relationship between seminar attendance through Microsoft Teams use and academic progress through Microsoft Teams use

Correlations			
		Academic progress through Microsoft Teams use	Seminar attendance through Microsoft Teams
Pearson correlation	Academic progress through Microsoft Teams use	1.000	0.279
	Seminar attendance through Microsoft Teams	0.279	1.000
Sig. (1-tailed)	Academic progress through Microsoft Teams use		0.000
	Seminar attendance through Microsoft Teams	0.000	
N	Academic progress through Microsoft Teams use	238	238
	Seminar attendance through Microsoft Teams	238	238

The R2 value of the relationships between seminar attendance through Microsoft Teams and academic progress through Microsoft Teams use is 7.8%, F (1, 0.078), $p < 0.005$. This result indicates that 7.8% of the data according to fit the regression model. The model gets statistical significance (Sig. = 0.000; this means $p < 0.0005$).

As shown in Table 3.11 the beta value for academic progress through Microsoft Teams use is 0.279. The result means that 27.9% of the variance on academic progress through Microsoft Teams use is explained by seminar attendance through Microsoft Teams. Based on statistical outputs shown above, H # 2: The variance in academic progress through Microsoft Teams use is explained by seminar attendance through Microsoft Teams use, which is supported.

H # 3

As shown in Table 3.12, there is a relatively low positive correlation between Moodle's easy use and academic progress through Moodle use variables, $r = 0.218$, $n = 238$, $p > 0.005$. Hence, high scores of Moodle easy use are associated with high scores of academic progress through Moodle use (Table 3.13).

The R2 value of the relationships between Moodle's easy use and academic progress through Moodle use is 4.8%, F (1, 0.048), $p < 0.005$. This result indicates that 4.8% of the data according to fit the regression model. The model gets statistical significance (Sig. = 0.001; this means $p < 0.0005$).

Table 3.10 R Square value of the relationship between seminar attendance through Microsoft Teams use and academic progress through Microsoft Teams use

Model summary									
Model	R	R square	Adjusted R square	Std. error of the estimate	Change statistics				
					R square change	F change	df1	df2	Sig. F change
1	0.279[a]	0.078	0.074	1.00859	0.078	19.876	1	236	0.000

[a] Predictors: (Constant), Seminar Attendance through Microsoft Teams

Table 3.11 Standardized Coefficients Beta of the relationship between seminar attendance through Microsoft Teams use and academic progress through Microsoft Teams use

Coefficients									
Model		Unstandardized coefficients		Standardized coefficients	t	Sig	Correlation		
		B	Std. error	Beta			Zero-order	Partial	Part
1	(Constant)	1.979	0.250		7.915	0.000			
	Seminar Attendance through Microsoft Teams	0.332	0.074	0.279	4.458	0.000	0.279	0.279	**0.279**

[a] Dependent Variable: Academic progress through Microsoft Teams use

Table 3.12 Pearson correlation outputs of the relationship between Moodle easy use and academic progress through Moodle use

Correlations			
		Academic progress through Moodle use	Moodle easy use
Pearson Correlation	Academic progress through Moodle use	1.000	0.218
	Moodle easy use	0.218	1.000
Sig. (1-tailed)	Academic progress through Moodle use		0.000
	Moodle easy use	0.000	
N	Academic progress through Moodle use	238	238
	Moodle easy use	238	238

As shown in Table 3.14 the beta value for academic progress through Microsoft Teams use is 0.218. The result means that 21.8% of the variance on academic progress through Moodle use is explained by Moodle's easy use. Based on statistical outputs shown above, H # 3: The variance in academic progress through Moodle use is explained by Moodle use, which is supported.

3.5 Discussion

The purpose of the study is to investigate the effect of Moodle and Microsoft Teams' key competencies on academic progress through Moodle and Microsoft Team's use. The prior assumption was that Moodle and Microsoft Teams' key competencies impact academic progress through Moodle and Microsoft Team's use.

The study found that there are differences between the low levels of download lectures values (never or sometimes: 21.3%), and the high levels (frequently or always: 78.2%). It is revealed that the most of students (78.2%) download lectures from Moodle most frequently or always during the academic year. The study showed that there are differences between the low levels of download exercises or other supported material values (never or sometimes: 23.8%), and the high levels (frequently or always: 85.7%). It is found that the most of students (85.7%) download exercises or other supporting material from Moodle most frequently or always during the academic year. The study indicated that there are huge differences between the low levels of lecture attendance through Microsoft Teams values (never or sometimes: 13.4%), and the high levels (frequently or always: 86.2%). It is shown that most of the students (86.2%) attended lectures through Microsoft Teams most frequently or always during the academic year.

Table 3.13 R Square value of the relationship between Moodle easy use and academic progress through Moodle use

Model summary									
Model	R	R square	Adjusted R square	Std. error of the estimate	Change statistics				
					R square change	F change	df1	df2	Sig. F change
1	0.218[a]	0.048	0.044	0.93538	0.048	11.819	1	236	0.001

[a] Predictors: (Constant), Moodle easy use

Table 3.14 Standardized Coefficients Beta values of the relationship between Moodle easy use and academic progress through Moodle use

Coefficients									
Model		Unstandardized coefficients		Standardized coefficients	t	Sig	Correlations		
		B	Std. error	Beta			Zero-order	Partial	Part
1	(Constant)	2.098	0.203		10.319	0.000			
	Moodle easy use	0.208	0.060	0.218	3.438	0.001	0.218	0.218	0.218

[a]Dependent Variable: Academic progress through Moodle use

The study also indicated that there are considerable differences between the low levels of seminar attendance through Microsoft Teams values (never or sometimes: 13.4%), and the high levels (frequently or always: 82.4%). It is revealed that the most of students (82.4%) attended seminars through Microsoft Teams most frequently or always during the academic year. It is found that there are differences between the low levels of using the Moodle values (never or sometimes: 22.2%), and the high levels (frequently or always: 77.4%). The study found out that the most of students (77.4%) use Moodle most frequently or always during the academic year. It is also found that there are considerable differences between the low levels of using the Microsoft Teams easy values (never or sometimes: 15.9%), and the high levels (frequently or always: 77.4%). The study revealed that the most of students (83.7%) use Microsoft Teams most frequently or always during the academic year.

The study indicated that there are differences between the low levels of easy test access in Moodle values (never or sometimes: 13.8%), and the high levels (frequently or always: 85.7%). The study showed that the most of students (85.7%) access the tests easily in Moodle most frequently or always during the academic year. The study indicated that there are differences between the low levels of test access in Microsoft Teams values (never or sometimes: 16.3%), and the high levels (frequently or always: 83.2%). It is shown that most of the students (83.2%) access the tests in Microsoft Teams most frequently or always during the academic year.

It is indicated that there are differences between the low or medium levels of academic progress through Moodle use values (33.4%), and the high or very high levels (66.5%). The study found out that, the most of students (66.5%) achieved high or very high levels of academic progress through Moodle use during the academic year. It is also indicated that there are considerable differences between the low or medium levels of academic progress through Microsoft Teams use values (25.6%), and the high or very high levels (74.4%). The study revealed that the most of students (74.4%) achieved high or very high levels of academic progress through Microsoft Teams use during the academic year.

It is found a relatively positive high correlation between lecture attendance through Microsoft Teams and academic progress through Microsoft Teams use variables ($r = 0.619$). This indicates that high scores of lecture attendance through Microsoft Teams

are associated with high scores of academic progress through Microsoft Teams use. The R2 value of the relationships between lecture attendance through Microsoft Teams and academic progress through Microsoft Teams indicates that 38.3% of the data according to fit the regression model. The study found out that 61.95% of the variance on academic progress through Microsoft Teams use is explained by lecture attendance through Microsoft Teams. The result was consistent with some previously reported works, which argued that lecture attendance through Microsoft Teams predicts academic progress through Microsoft Teams use (Neuwirth et al., 2020; Shehata et al., 2020).

The study found out a relatively low positive correlation between seminar attendance through Microsoft Teams and academic progress through Microsoft Teams use variables ($r = 0.279$). This indicates that high scores of seminar attendance through Microsoft Teams are associated with high scores of academic progress through Microsoft Teams use. The R2 value of the relationships between seminar attendance through Microsoft Teams and academic progress through Microsoft Teams use indicates that 7.8% of the data according to fit the regression model. The study revealed that 27.9% of the variance on academic progress through Microsoft Teams use is explained by seminar attendance through Microsoft Teams. The result was consistent with some review research, which argued that seminar attendance through Microsoft Teams predicts academic progress through Microsoft Teams use (Williams & van Rooij, 2017; Wart et al., 2017; Wan & Nicholas, 2010; Boling & Beatty, 2010).

It is revealed a relatively low positive correlation between Moodle's easy use and academic progress through Moodle use variables ($r = 0.218$). This indicates that high scores of Moodle use are associated with high scores of academic progress through Moodle use. The R2 value of the relationships between Moodle's easy use and academic progress through Moodle indicates that 4.8% of the data according to fit the regression model. It is shown that 21.8% of the variance on academic progress through Moodle use is explained by Moodle's easy use. The result was consistent with some literature review works, which argued that Moodle use predicts academic progress through Moodle use (Dalziel, 2011; Kim et al., 2011; Hollyhead et al., 2012; MacLeod et al., 2018).

The results of the study also supported by other research about the influence of Moodle and Microsoft Teams' key competencies on academic progress through Moodle and Microsoft Teams have significant implications for future research. Such research should investigate the relationships between academic progress through Moodle and Microsoft Teams use and other variables. The results of this study also have significant implications for practice. The important support should be designed to develop and support students because it is confirmed by this study that Moodle and Microsoft Teams' key competencies influence academic progress through Moodle and Microsoft Team's use. Overall, the findings of this study fostered theoretical and practical understanding as Moodle and Microsoft Teams' key competencies are important variables that impact academic performance through Moodle and Microsoft Team's use.

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