Development of Indonesia's Digital Education Platform for Learning: Unified Model

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Manuscript received July 19, 2024; revised September 22, 2024; accepted December 12, 2024; published May 21, 2025

***Abstract*—This study aimed at developing the Indonesia digital platform in which the evaluation was also conducted to evaluate its effectiveness by viewing the technology use and acceptance of the users with Unified Theory of Acceptance and Use of Technology (UTAUT) framework. Research and Development (R&D) was used as the research design particularly by adapting Waterfall model consisted of five main stages: requirement, design, implementation, verification, and maintenance. The study was conducted at SMK Telkom Bandung and SMK Telkom Malang. The research sample was 320 vocational high school students who were selected by using random sampling technique. The data were gained by distributing questionnaires to the research sample. The instrument used in this study was questionnaire designed by adapting UTAUT framework. The data were analyzed using Structural Equation Modelling (SEM) data analysis techniques with the SmartPLS 4.0 program. The results show that effort expectations and facilitating conditions have a positive and significant direct effect on the use of PIJAR (developed digital platform) whereas performance expectations and social influence have no significant effect. Group, age, and gender do not have a moderating effect on the use of PIJAR.**

***Keywords*—digital platform, Unified Theory of Acceptance and Use of Technology (UTAUT), waterfall model**

I. Introduction

The development of science and technology significantly change an education as a human's life aspect [1–3]. This development is along with the great shifting phenomenon occurs due to COVID-19 pandemic where the traditional learning system has been transmitted into blended learning assisted by the use of technology [4, 5]. In addition, it also supports the emphasis of 21st century learning demanding the integration of technology in the learning process [6]. The advancement of technology is perceived as a means for providing flexibility in the teaching and learning process [7–9]. It removes the traditional learning boundaries of time and place which facilitates the interaction between students and teachers [7]. The limited direction interaction required during COVID-19 becoming the challenge in education system can be overcome by the use of technology in which technology promotes an innovative means or strategies used to support the blended learning itself [10]. It indicates that technology has an essential role in the teaching and learning process particularly during COVID-19 pandemic as the reflection of 21st century learning [11–14].

The phenomenon of technology involvement in the learning process during COVID-19 pandemic is strengthened by the government in many countries including Indonesia. The integration of technology has been long emphasized in Indonesian education system as what has been shown in Law Number 20 of 2003 concerning the national education system. It states that infrastructure and technology improvement are the pillars to support the distant learning policy during COVID-19 pandemic era [15]. The new curriculum called as *Merdeka Belajar* program is also a way used by Indonesian Ministry of Education and Culture to repair the educational system during and after COVID-19 pandemic in which the educational institutions are allowed to provide the learning process in blended learning mode to promote students as independent learners [16, 17]. It is along with the regulation number 4 of 2020 published by the Minister of Education and Culture which demands the educational stakeholders to conduct a meaningful learning for the students without burdening them with the demands of completing all curriculum achievements, promotional grades, or graduation [18]. Therefore, blended learning is selected as a way of integrating technology and an adjusting learning model to optimize the learning process during and after COVID-19 and as the realization of technology integration in Indonesian learning system [19].

Blended learning is a learning process combining conventional learning and distant learning. It is recognized as a mix learning model concerning on online-technology-based interaction and conventional interaction occur in the learning process providing flexibilities for the students and teachers [20–23]. Students and teachers are allowed to have direct interaction through conventional learning and unlimited learning space and time through online learning [24–27]. Blended learning also prompts students-centred learning through engaging learning activities designed in the online or conventional forms [28–30]. The flexibility and meaningful learning process through the provision of students-centered learning in the form of online and offline activities cover the limitation of learning process during and after COVID-19 pandemic.

The implementation of blended learning is inseparable with the technological facility which supports its implementation. The facility is e-learning or commonly known as learning management system. It is defined as a software application used for teaching and learning process including the administration needed in education system [31, 32]. E-learning is also recognized as a supporting component connecting students and teachers during the online learning to optimize the limitation found in conventional learning [33]. It has been functioned as a learning media which offers a wide access for students to obtain and gain information through a various learning sources provided in e-learning [34–37]. Another definition shows that e-learning is designed as a web-based media

presenting various learning content [34, 36, 38]. It can be seen that e-learning is a supporting learning media to conduct an optimal blended learning.

The development of Information Communication Technology (ICT) has emerged in various digital learning platforms [39]. The emergence of digital learning platforms is believed as an essential part of the learning process but it cannot be denied that continuous development towards a digital learning platform is still required to reach an optimal blended learning process. This is due to the recent problem found in the preliminary observation conducted by the researcher at SMK Telkom Bandung and SMK Telkom Malang. Both of those vocational schools conduct a blended learning process. The blended learning process has been conducted through the use of e-learning platforms, such as; Google Classroom, Edmodo, and Schoology. In fact, the whole educational process is still limited by unsupported digital platforms. The learning platforms cannot cover the other educational process that needs to be conducted to support the blended learning process since it is not only focused on the students themselves. Another platform is required to support the administration process by providing the presence of the students, teachers, and other administration needed to support the online learning process.

The condition above can be a serious problem due to the limited learning facility that can become an obstacle to conduct optimal learning process. It is due to the consideration that a successful blended learning implementation also depends on other stakeholders. The contribution given by teachers, staff, and stakeholders to support the learning process optimizes the success of blended learning [40, 41]. Therefore, the development of digital learning platforms which is able to cover all the educational processes including the teaching & learning process, and administration process is required to be conducted. Several studies have been conducted related to the development of digital learning platforms. The previous studies have developed e-learning platforms to support the online learning process as a part of blended learning for vocational and higher education. The studies show that the developed learning platform has good quality and is effective to be used but it does not develop to offer a space for the teachers and staff to conduct administrational processes, such as; administering the presence, gradings, and presenting the other administration.

As a further action, a recent study was conducted to develop a digital platform that can be used as a learning platform including an educational platform that covers all the administration done in the vocational schools. It is due to the problem found at SMK Telkom Bandung and SMK Telkom Malang related to the limited facilities of the used learning platform. The digital platform developed in this study is also conducted due to the scarcity of developing a digital platform that is able to be used for covering all educational processes as what has been discussed in the previous studies. The success of the developed digital platform of this study is also viewed by evaluating the product with the Unified Theory of Acceptance and Use of Technology (UTAUT) framework covering four aspects of technological use and acceptance; performance expectancy, social influence, effort expectancy, and facilitating condition. It is conducted by investigating the relation among those aspects towards the effectiveness of developed product in this study. It needs to be conducted since the users' behaviors determine the effectiveness of technological means used in education [42, 43]. In addition, the developed product is also investigated by finding the relation among the UTAUT aspects and other factors such as job, age, and gender as the background of its users. Briefly, this recent study was based on the dissertation that intended to develop a digital platform to support blended learning process which covers all the educational process in which the developed product is evaluated with UTAUT framework to measure its effectiveness.

II. Literature Review

A. Blended Learning

Blended learning is widely perceived as a learning model combining mixed media and pedagogy to provide online-technology-based interaction and conventional interaction [44, 45]. It refers to a learning model used to prompt students' learning interest by functioning technological means in providing a new learning experience for students without limiting their direct interaction in conventional mode [46, 47]. Blended learning can be viewed from three understandings, such as; as a web-based online model and conventional model, a combination of mixed learning media and materials, and a combination of various learning approaches reflected on the technology integration. In conclusion, blended learning is a learning model providing various learning activities through the combination of online and offline learning.

B. E-Learning

E-learning is a utilization of Information Communication Technology (ICT) in the form of a learning management system used to facilitate the packaging of educational needs, such as; interactive learning media, virtual learning conferences, teaching materials, discussion forums, and educational administration [48]. It is also used as a supporting learning component to maximize the interaction between teachers and students through the provision of unlimited learning space and time [31, 33]. E-learning has a role as a web-based learning media used for presenting the learning contents and increasing the interaction between students and teachers where they can access various learning sources [34, 36, 38, 49–52].

C. Unified Theory of Acceptance and Use of Technology (UTAUT) Framework

Unified Theory of Acceptance and Use of Technology (UTAUT) also known as the unified theory of acceptance and use of technology is developed from psychological and sociological theory in which it is utilized to obtain the technology acceptance and use [42]. There are four main keys proposed in this theory such as; performance expectancy, effort expectancy, social influence, and facilitating conditions and it also deals with four moderatos including; age, gender, experience, and voluntariness [53]. Performance expectancy is the degree how which the developed product helps its users in gaining their personal satisfaction, personal accomplishment, social interaction, and social approval [54]. Social influence deals with the influence or support contributed by the users' social circle to encourage them to

use the developed product [55]. Effort expectancy is conceptualized as the degree of ease associated with the use of a developed product in the teaching and learning process as the context of its usage [42]. The facilitating condition refers to the degree of an individual's belief in the existence of a developed product in supporting its usage system [42]. In order to predict the behavioral intention, the four moderators have an essential role in determining the technology use and acceptance [53].

III. Method

This study was designed in the form of research and development which was covered into four main stages as presented in Fig. 1 as follows.

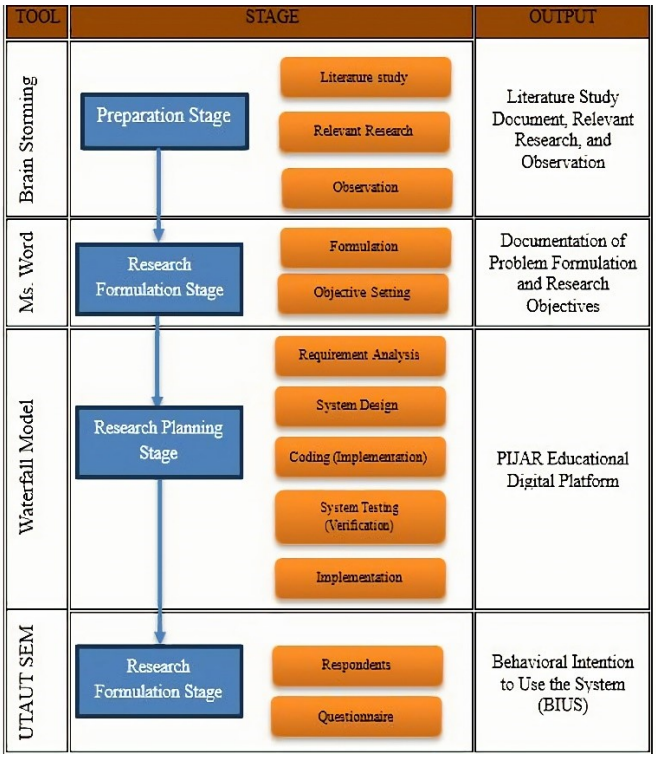

Fig. 1. Main stages of development.

In the preparation stage, relevant research, literature study, and observation were conducted to prepare research and development. Then, it was continued with research formulation stage in which it aimed to formulate the problems and research objectives settings. Further, the planning stage was done by adapting Waterfall method proposed by Pressman [56]. Waterfall method was also selected due to its major advantage in which this method provides a structured to organize and control a software development project through an accurate requirement stage. It provides a simple and methodical software development with a rigid and precise process [57]. The method was simple and easy to be understood in the implementation compared to another model. It was clear to manage the development process due to the rigidity of the model. Every phase has a specific deliverable and a review process. In addition, its phases were completely done at a time which did not overlap.

There were five stages proposed in Waterfall model; requirement, design, implementation, verification, and maintenance as presented in Fig. 2.

1) Requirement: it was a stage to identify the problem faced in the learning process and educational needs in the setting of the study. The requirement was conducted in detail and function as system specifications including literature study and field study.
2) Design: it was a stage to identify problems found in the requirement stage that was used as a basis for developing the digital platform. It meant that the design stage focused on designing or planning the product developed in this study including conceptual, physical concept, sequence, and flow maps.
3) Implementation: it was a stage for implementing the developed product to the target or research sample in this study.
4) Verification: it was a stage where the developed product was verified and validated its eligibility by the users.
5) Maintenance: it was a stage as a further action to revise or develop additional facilities to the developed product based on the verification result.

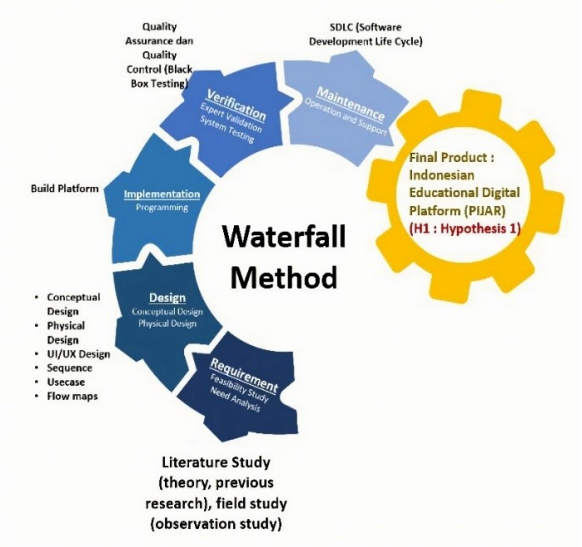

Fig. 2. Stages of waterfall method.

Finally, the evaluation stage was done by considering that the developed product underlined by behavioral intention of the users in which it was also investigated by using UTAUT theory. It was purposed to find out its effectiveness by obtaining the technology use and acceptance of the users.

In addition, the research sample of this study was 316 vocational high school students in which they were the students at SMK Telkom Malang and SMK Telkom Bandung since those schools were selected as the research setting. The research sample was selected by using random sampling technique in which there were 316 students were randomly selected by using Slovin formula. The formula was presented in Eq. (1) as follows.

$$n = \frac{population}{1 + population\ (standard\ of\ error)^2}$$

$$n = \frac{15000}{1+15000\ (0.05)^2} \quad (1)$$

$$n = 315.78$$

In addition, the developed product was also evaluated to find its effectiveness by obtaining the relationship between the use system of the product with the key aspects of UTAUT

(performance expectancy, social influence, effort expectancy, and facilitating condition) and the moderators (age, gender, and job). Therefore, the research objects were: 1) the development of Indonesia digital platform using Waterfall method; 2) the relationship between variables in UTAUT on the Indonesia digital platform's effectiveness; 3) the relationship of moderator variables on the Indonesia digital platform's effectiveness. In addition, there were several hypotheses tested in this study, such as:

1) H_1: there is a relationship between performance expectancy and the use of developed digital platform system.
2) H_1: there is a relationship between effort expectations and the use of developed digital platform system.
3) H_1: there is a relationship between social influence and the use of developed digital platform system.
4) H_1: there is a relationship between facilitator conditions and the use of developed digital platform system.
5) H_1: there is a relationship between performance expectancy, job, and the use of developed digital platform system.
6) H_1: there is a relationship between effort expectancy, job, and the use of developed digital platform system.
7) H_1: there is a relationship between social influence, job, and the use of developed digital platform system.
8) H_1: there is a relationship between facilitating condition, job, and the use of developed digital platform system.
9) H_1: there is a relationship between performance expectance, age, and the use of developed digital platform system.
10) H_1: there is a relationship between effort expectancy, age, and the use of developed digital platform system.
11) H_1: there is a relationship between social influence, age, and the use of developed digital platform system.
12) H_1: there is a relationship between facilitating condition, age, and the use of developed digital platform system.
13) H_1: there is a relationship between performance expectancy, gender, and the use of developed digital platform system.
14) H_1: there is a relationship between effort expectancy, gender, and the use of developed digital platform system.
15) H_1: there is a relationship between social influence, gender, and the use of developed digital platform system.
16) H_1: there is a relationship between facilitating condition, gender, and the use of developed digital platform system.

The root construct of questionnaire was derived from certain theory as presented in Appendix Tables A1 to A4. In addition, the data of this study were obtained through questionnaire. The participants' responses from questionnaire were not gathered anonymously. The questionnaire was designed by adapting the UTAUT framework proposed by Wulf and Blohm [53], as presented in Table 1.

The validity of instrument above was done by Aiken's V formula [58] as presented in Eq. (2) as follows.

$$V = \frac{\sum s}{n(c-1)} \quad (2)$$

$s = r - lo$
V = Item validity index
n = Number of raters (experts)
c = Highest validity score
lo = Lowest validity score
r = Score given by the rater (expert)

Then, to interpret the validity values of each item obtained from the calculation of the item validity index, the results of the content validity were clarified as follows:

$0.80 < V \leq 1.00$ = Very High
$0.60 < V \leq 0.80$ = High
$0.40 < V \leq 0.60$ = Adequate
$0.20 < V \leq 0.40$ = Low
$0.00 < V \leq 0.20$ = Very Low

Table 1. The Questionnaire construct items

No	Construct	Questions
1	*Performance Expectancy (PE)*	I find the school's e-learning system useful in the learning process Using the school's e-learning system helps me complete tasks faster Using the school's e-learning system increases my productivity Using the school's e-learning system increases my chances of improving grades/work results
2	*Effort Expectancy*	Interactions in the school's e-learning system are clear and easy to understand Using this program makes it easy for me to enhance my skills I acknowledge that this program is easy to use It's easy for me to learn how to operate this program
3	*Social Influence*	Influential people advise me to use the school's e-learning system Important people in my life recommend me to use the school's e-learning system Professors/lecturers in my classes have been greatly assisted by the use of the school's e-learning system In general, the university supports the provision of the school's e-learning system
4	*Facilitating Conditions*	I have the necessary resources for using the school's e-learning system I have the necessary knowledge for using the school's e-learning system The school's e-learning system is not compatible with all programs I have used There is a dedicated technician (or group) who assists with difficulties in using the school's e-learning system
5	*Behavior Intention to Use*	I am willing to use the school's e-learning system in the next semester I plan to use the school's e-learning system in the next semester I intend to use the school's e-learning system in the next semester

Furthermore, the data in this study were analyzed using Structural Equation Modeling (SEM) to examine the influence of independent variables on the dependent variable. Structural Equation Modeling (SEM) is one type of multivariate analysis. Multivariate analysis is the application of statistical methods to simultaneously analyze several research variables [59]. The SEM technique used in this study is variance-based SEM, which is often referred to as Partial Least Squares (PLS). The focus of PLS is to maximize the variance of the dependent variables explained by the

independent variables, rather than reconstructing the covariance matrix as in covariance-based SEM [60]. PLS is a regression-based technique rooted in path analysis. PLS is known as a good approach to studying relationship models that involve multiple constructs with multiple measurements. The technical superiority of PLS over regression techniques and factor analysis is because the items measuring a construct (i.e., measurement model) are evaluated in the context of its theoretical model [61].

IV. Results

A. The Development of Platform Indonesia Belajar (PIJAR) Using Waterfall Model

There were five steps of Waterfall model in developing PIJAR as follows.

1) Requirement

This stage is done to identify problems and collect all the necessary information for developing digital education platforms. It involves 100 people from Telkom Malang Vocational School and Telkom Bandung Vocational. The permission to collect the data in these vocational schools is approved by the principals in the school. Telkom Malang Vocational School concerned the information technology, whereas Telkom Bandung concerned the tourism as presented in Fig. 3.

Then, some problems are identified from the results of interviews with samples of the study. The results of the interview are presented in Table 2 below.

Fig. 3. Requirement step in Telkom Malang Vocational School.

Table 2. Problems found during interview

Problems	Days							Total
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
Lack of integrated and comprehensive learning facilities	0	9	8	14	10	6	0	47
It is integrated facilities connected to basic education data	0	8	7	12	9	5	0	41
Less interactive learning materials	0	7	7	11	8	4	0	37
Less learning materials that can be s out of schools	0	6	7	10	7	4	0	34
The need of up-to-date learning materials	0	3	7	8	4	5	0	27
Difficulty in finding whole learning materials	0	3	6	7	4	3	0	23

Table 2 shows some problems faced in the learning process covering lack of integrated and comprehensive learning facilities, lack of integration to basic education data, less interactive learning materials, less learning materials that can be accessed out of schools, the need of up-to-date learning materials, and difficulty in finding whole learning materials. Regarding the obtained problems above, the most important problem in the education is the lack of, useful, attractive, and easy-use technology-based learning facilities which is integrated with basic education data in Indonesian. This technology can be used by students, parents, teachers, and the government. The consideration of the main problem becomes the basic foundation for entering the design phase.

2) Design

The design phase is the stage in which the digital education platform "*Indonesia Belajar*" (PIJAR) was to cope the problem in the requirement step. The system design begis with creating a context diagram that generally explains the process of the system being built as presented in Fig. 4.

Fig. 4 shows four external entities in the PIJAR's implementation, namely students, teachers, school administrators, and parents. Students can do task submissions, and fill out exams from the question bank released by the system, and the system responds by flowing data such as question banks, grades, attendance, school schedule, and learning content. Parents could get class information, school schedules, student grades, and school calendars. School Admins manage tasks, content, virtual classes, syllabuses, class schedules, and announcements. Teachers can manage learning schedules, syllabuses, classes, exam questions, tasks,

content, attendance, learning outcomes, and grades.

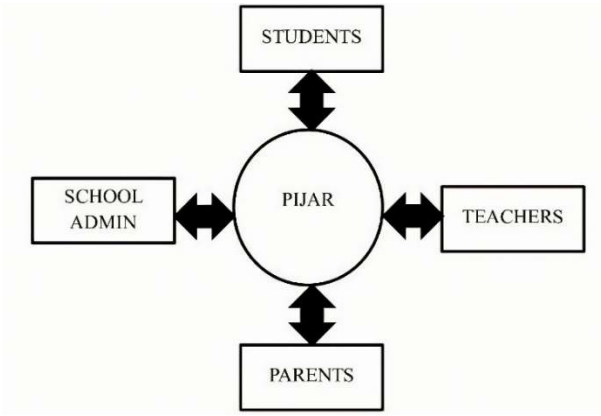

Fig. 4. Context diagram.

In addition, PIJAR is designed to assist the integrated digital learning system that supports schools in creating fun digital learning experiences. PIJAR is designed with thousands of interesting digital content, ranging from interactive digital books, digital books, and learning videos, to virtual laboratories that could be used by all students to support their learning in school. Moreover, PIJAR helps schools in conducting exams. The existence of PIJAR allows schools to conduct Application-Based School Exams (UBK) and facilitates teachers in making exam questions, scheduling exams, monitoring exams, and checking exam results. Furthermore, PIJAR is also designed for administrative and operational management, as well as school management through the School Information Management System (SIM) feature. It eases the administrative and operational management.

3) Implementation

In general, the implementation of the PIJAR produces modules for administrators, teachers, students, and parents. The PIJAR is developed by the researchers using AWS and Flou with specifications, namely 1) hardware server covering a) AWS: 8 vCPU, 32 Gb RAM, 420 SSD, 1 IP Public, Data transfer; b) FloudCloud Server: Standard 8 vCPU, 32 Gb RAM, 420 Disk, 1 IP Public, 10 Mbps Bandwidth; 2) software server covering a) Database: NOSQL, b) Web Programming: NodeJS and ReactJS; and 3) All peripherals are connected to the internet and browser is supported with very minimal bandwidth requirements.

The main page of PIJAR is a page for authentication, as shown in Figs. 5 and 6.

Fig. 5 shows the main page of PIJAR website in which it could be accessed by students and school. At the page, the users can choose their role in accessing it. Then, there is additional information about login as school or student. The users need to choose their roles to login.

Fig. 5. Main page of PIJAR website.

Fig. 6. Login form.

Fig. 6 shows the login form of PIJAR *"Pijar Sekolah"*. The users are required to fill in the username and password to login it. There is also an option to remember me if the user forgets the password. After logging in to the website, the next menu is presented in Figs. 7 to 10.

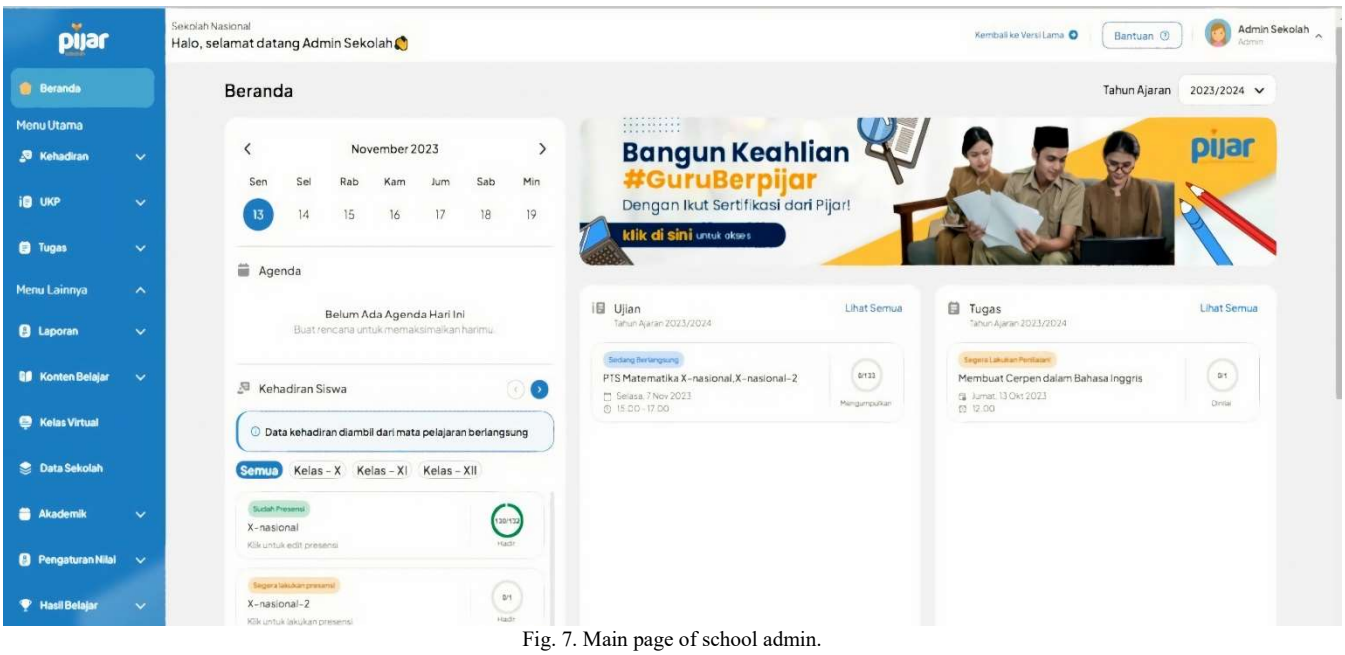

Fig. 7. Main page of school admin.

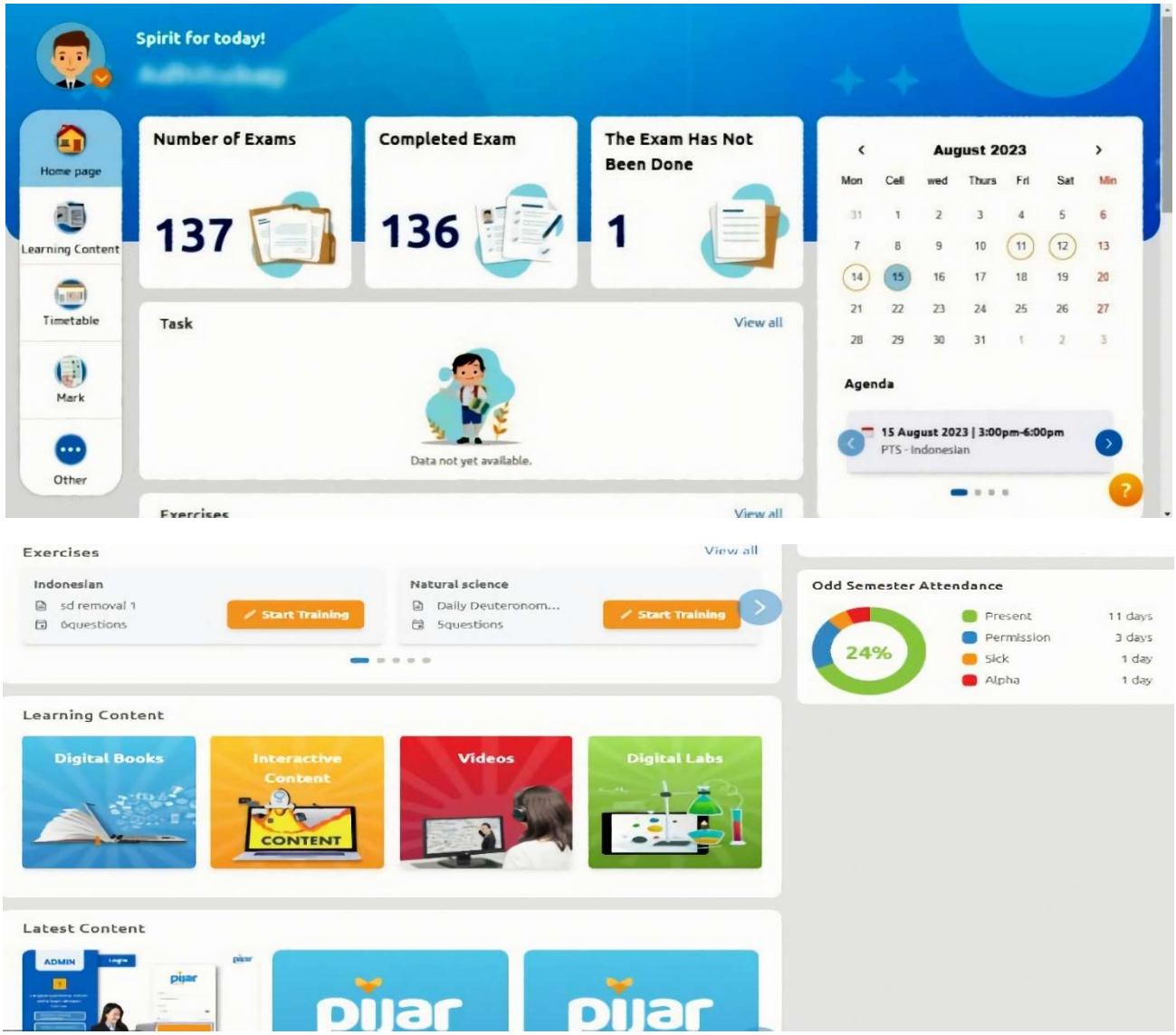

Fig. 8. Main page of the student.

Fig. 7 shows the login verification process if the user logged in as an admin school. It is "Welcome by *Halo, Selamat datang admin sekolah*/ Hello, welcome school admin". Then, on the left side, some menus can be accessed, namely "*Beranda*/ Dashboard, *Kehadiran*/ Attendance, *Tugas*/Assignment, *Laporan*/Report, *Konten Belajar*/Learning Content, *Kelas Virtual*/Virtual Class, *Data Sekolah*/School Data, *Akademik*/Academic, *Pengaturan Nilai*/ Grade Setting, and *Hasil Belajar*/ Learning Outcomes. On the dashboard, it provides information about dates, students' attendance from different classes, tests, as well as assignments. On the other side, for the main page of the teacher, if the user is a school teacher, the information covers the total of teachers (*jumlah guru*), and the total of students (*jumlah siswa*). In addition, there are three learning sources, namely digital book (*buku digital*), interactive book (*buku interaktif*), and video. Moreover, there are some menus on the left side covering Dashboard (*Beranda*), Learning house (*Rumah Belajar*), Pre-test/Task, Virtual class (*Kelas Virtual*), Students Data (*Data Siswa*), Teachers Data (*Data Guru*), Learning Outcomes (*Hasil Siswa*), Attendance Report (*Report Absensi*). In addition, teachers can update, add, delete or only view data.

Fig. 8 shows the main page of students if the user is a student. There is some information in the application which can be accessed by students. Besides, students can update, add, delete data, or just view data.

Fig. 9. Main page of parents.

Fig. 9 shows the main page of parents if the user logs in as a parent of students. The provided menus or modules cover

Kehadiran/Attendance, *Silabus*/Syllabus, *Jadwal*/Schedule, *Nilai*/Grades, *Guru*/Teachers, *Tugas Siswa*/Student's Assignments, and *Pengumuman*/Announcements. Moreover, parents could also update, add, delete data, or just view data.

4) Verification

This step is conducted to verify/validate the eligibility of the PIJAR system to be implemented in the educational environment. 10 usability heuristics method proposed by Jacob Nielsen [62] is used to verify the eligibility of PIJAR as shown in Fig. 10.

Fig. 10 shows ten components as considerations for verifying PIJAR. To, alternatively, borrow the words of Nielsen [62] the 10 heuristics can be described as 1) visibility of system status, 2) match between system and the real world, 3) user control and freedom, 4) consistency and standards, 5) error prevention, 6) recognition rather than recall, 7) flexibility and efficiency of use, 8) aesthetic and minimalist design, 9) assistance for users to recognize error, and 10) assistance and documentation.

Fig. 10. Ten usability heuristics.

Then, those 10 components above are evaluated in the form of a Severity Rating Scale as follows.

0 = not a usability problem;

1 = cosmetic problem only; can be fixed in spare time; example: typos, misspellings

2 = minor usability problem; low priority for improvement; example: inconsistent colour style, language

3 = major usability problem; top priority for improvement; example: main function and main journey.

4 = usability catastrophe; must be fixed before release; example: payment, add to cart, register.

Based on the evaluation conducted by the evaluators, it can be concluded that this digital education platform was suitable for large-scale implementation as shown in Table 3.

Table 3 shows the results of 10 Usability Heuristic parameters. Error prevention aspect receives a severity rating of 3 with total of 5 findings whereas the rest aspects received a severity rating of 2 with total of 121 findings. It shows that many low-priority improvements need to be made before implementing the platform to real users. In addition, to achieve a scale of zero, these findings were fixed as soon as possible.

Table 3. Verification results of PIJAR

No	10 Usability Heuristic	Total of Findings	Severity Rating
1	Visibility of system status	14	2
2	Match between system and the real world	13	2
3	User control and freedom	10	2
4	Consistency and standards	20	2
5	Error prevention	5	3
6	Recognition rather than recall	11	2
7	Flexibility and efficiency of use	21	2
8	Aesthetic and minimalist design	21	2
9	Help users recognize, diagnose, and recover from errors	2	2
10	Help and documentation	4	2

5) Maintenance

The development of PIJAR caused maintenance to become an integral part parallel to the system that has been already running well. PIJAR provides a control tower dashboard feature that could facilitate the Ministry, Department, Foundation, or School Principal to analyze and monitor the learning process. This dashboard can be used as a basis for further development, both hardware and software. The reliability of the PIJAR system could be guaranteed because it is implemented in the Telkom Sigma-managed Flou cloud, which has experience in cloud and data center development.

B. The Relationship between Variables in UTAUT Model on PIJAR's Effectiveness

The meaning of the data obtained during the study can be known by describing the research variables. A class interval measurement scale is used to present the criteria of distributed questionnaires as presented in Eq. (3).

$$Class\ Interval = \frac{Highest\ Score - Lowest\ Score}{Number\ of\ Class} = \frac{5-1}{3} = 1.33 \quad (3)$$

Therefore, the scale of respondent answer criteria based on the result of Eq. (3) calculation is described as follows.

1.00–2.33 = Low

2.34–3.67 = Medium

3.68–5.00 = High

Then, mean results of respondent's questionnaires are classified by the criteria above as presented in Table 4.

Table 4 shows the average score of five variables in the questionnaires, namely 1) the average score of performance expectancy was high; 2) the average score of effort expectancy was medium; 3) the average score of social influence was high; 4) the average score of facilitating condition was high; and 5) average score of system use was high. Then, the analysis of the measurement model (outer model) was carried out through four stages of testing, namely individual item reliability, internal consistency reliability, average variance extracted, and discriminant validity.

Table 4. Respondent's survey answer

Variables	Indicators	Mean	Criteria
Performance Expectancy (PE)	(1) Using PIJAR will affect students' learning achievement	4.06	High
	(2) Using PIJAR can improve students' grades	4.05	High
	(3) Using PIJAR can help me complete my assignments	4.17	High
	(4) Using PIJAR in learning is more effective than using other systems	3.93	High
	Average Score of Performance Expectancy	4.05	High
Effort Expectancy (EE)	(1) My interaction with the PIJAR system is clear and understandable	4.02	High
	(2) Using the PIJAR system is not complicated and difficult to understand	2.43	Medium
	(3) Overall, I think the PIJAR system is easy to use	4.11	High
	Average Score of Effort Expectancy	3.52	Medium
Social Influence (SI)	(1) Important people in my life think that I should use PIJAR	3.80	High
	(2) My school and people close to me support the use of PIJAR	3.95	High
	(3) I am proud to use the PIJAR system at school	4.15	High
	Average Score of Social Influence	3.97	High
Facilitating Condition (FC)	(1) I have the necessary knowledge to use the PIJAR system	3.85	High
	(2) I have received training and/or instructions for using the PIJAR system and there are people or groups who help when there are difficulties in using PIJAR	4.01	High
	(3) There are people or groups who help when there are difficulties in using PIJAR	3.98	High
	(4) I have the resources needed (e.g., smartphone, PC, internet access) to access PIJAR	4.26	High
	Average Score of Facilitating Condition	4.02	High
System Use (SU)	(1) I am enthusiastic about using PIJAR in school learning activities	3.92	High
	(2) I plan to continuously use PIJAR when needed for school learning activities	3.88	High
	(3) I hope PIJAR will be utilized and developed more widely	4.44	High
	Average Score of System Use	4.08	High

1) Individual item reliability testing

The test is conducted by looking at the standardized loading factor values. These values indicated the strength of the relationship between each indicator and its construct. Loading factor values above 0.7 are considered valid as indicators measuring the construct [63–66]. The results of loading factor values are presented in Table 5.

Table 5 shows the result of the respondent's survey from Table 4. It can be seen that PE stands for Performance Expectancy; EE stands for Effort Expectancy; SI stands for Social Influence; FC stands for Facilitating Condition; and SU stands for System Use. The number in the bracket from Eqs. (1) to (4) reflected the items of the five variables mentioned before. The results show that all the items of each variable were above 0.7. All variables are valid as indicators measuring construct. It indicated that the strength of the relationship between each indicator and its construct was high.

Table 5. Loading factor test results using SmartPLS

Variables	Outer Loadings
PE (1)	0.708
PE (2)	0.900
PE (3)	0.872
PE (4)	0.845
EE (1)	0.884
EE (2)	0.795
EE (3)	0.918
SI (1)	0.768
SI (2)	0.827
SI (3)	0.869
FC (1)	0.778
FC (2)	0.903
FC (3)	0.914
FC (4)	0.920
SU (1)	0.892
SU (2)	0.913
SU (3)	0.839

2) Internal consistency reliability test

Then, the internal consistency reliability test is done to determine the validity of similar items on a test. It was done by looking at the value of Composite Reliability (CR) with a threshold above 0.7 [63–66]. The pattern of CR is presented in Eq. (4) as follows:

$$\rho_c = \frac{(\Sigma\lambda i)^2\, Var\, F}{(\Sigma\lambda i)^2\, Var\, F + \Sigma\Theta ii} \quad (4)$$

ρ_c = composite reliability
λ_i = loading factor
$Var\ F$ = variance factor
Θ_{ii} : Error Variance

Then, the results of the consistency reliability test are presented in Table 6.

Table 6. Composite reliability test results with SmartPLS

Variable	Composite Reliability
PE (Performance Expectancy)	0.867
EE (Effort Expectancy)	0.864
SI (Social Influence)	0.829
FC (Facilitating Condition)	0.909
U (System Use)	0.863

Table 6 shows that all CR values were above 0.7, indicating that all variables were valid. A higher CR value indicates a higher level of reliability. Since the result of CR values were above 0.7, the items of the instrument were reliable to gather data.

3) Convergent validity test

The convergent validity test was conducted by looking at the Average Variance Extracted (AVE) value. This value represented the amount of variance or diversity of manifest variables (indicators) that could be contained by the latent variables (constructs). A minimum AVE value of 0.5 indicates good convergent validity [63–66]. The pattern of AVE is presented in Eq. (5) as follows:

$$AVE = \frac{(\Sigma\lambda i)^2\, Var\, F}{(\Sigma\lambda i^2) Var\, F + \Sigma\Theta ii} \quad (5)$$

λi = loading factor

Var F = variance factor

Θii: Error Variance

Then, the results of the average variance were extracted as presented in Table 7.

Table 7. Average Variance Extracted (AVE) test results

Variable	AVE
PE (Performance Expectancy)	0.696
EE (Effort Expectancy)	0.752
SI (Social Influence)	0.659
FC (Facilitating Condition)	0.832
SU (System Use)	0.778

Table 7 shows that all AVE values are higher than 0.5. It indicated that all variables were valid. The AVE values are used to determine the validity of instruments. Higher AVE values indicate higher validity of items used in the instruments to collect the data.

4) Discriminant validity test

This testing involves two stages of cross-loading examination, namely cross-loading between indicators and Fornell-Lacker's cross-loading [67]. The cross-loading examination of each indicator is carried out by comparing the relationship between the indicator and its construct as well as with other blocks of constructs. If the correlation between the indicator and its construct is higher than the correlation with other construct blocks, it indicates that the construct predicted the size of its block better than other blocks. The pattern of discriminant validity can be presented in Eq. (6) as follows:

$$\frac{r_{xy}}{\sqrt{r_{xx}} \times \sqrt{r_{yy}}} \quad (6)$$

r_{xy} = correlation between x and y

r_{xx} = the reliability of x

r_{yy} = the reliability of y

Then, the results of discriminant validity are presented in Table 8.

Table 8 shows that the correlation of variables in one construct is higher than the correlation with other constructs. It indicates that the data has good discriminant validity.

The next step is done by performing the structural model analysis. The structural model analysis is conducted through six testing stages, namely path coefficient, effect size (F^2), coefficient of determination (R^2), Model Fit, and t-test.

5) Path coefficient estimation

The Path Coefficient testing stage was conducted to examine whether a variable has a positive or negative direction of relationship with other variables. There was a limit value in the Path Coefficient testing, which was if the Path Coefficient value > 0, the variable had a positive direction of relationship with other variables. Conversely, if the Path Coefficient value < 0, the variable had a negative direction of relationship with others. The results of the path coefficient with PLS-SEM are presented in Table 9.

Table 8. Discriminant validity cross loading test results

	PE	EE	SI	FC	SU
PE (1)	0.819	0.668	0.648	0.69	0.70
PE (2)	0.871	0.734	0.766	0.78	0.77
PE (3)	0.879	0.744	0.765	0.78	0.78
PE (4)	0.819	0.696	0.720	0.702	0.724
EE (1)	0.774	0.88	0.729	0.779	0.803
EE (2)	0.682	0.896	0.665	0.72	0.768
EE (3)	0.791	0.907	0.827	0.831	0.865
SI (1)	0.676	0.694	0.764	0.733	0.696
SI (2)	0.657	0.672	0.828	0.697	0.728
SI (3)	0.787	0.684	0.879	0.785	0.792
FC (1)	0.652	0.649	0.769	0.624	0.678
FC (2)	0.809	0.777	0.776	0.898	0.799
FC (3)	0.771	0.819	0.781	0.928	0.829
FC (4)	0.823	0.801	0.856	0.927	0.869
SU (1)	0.778	0.785	0.834	0.801	0.889
SU (2)	0.790	0.83	0.800	0.865	0.911
SU (3)	0.750	0.791	0.728	0.731	0.846

Table 9. Path coefficient result

	Original sample (O)	Sample mean (M)	Standard Deviation (SD)	T statistics (STDEV)	*p*-values
Performance Expectancy → System Use	0.138	0.144	0.097	1.419	0.156
Effort Expectancy → System Use	0.324	0.316	0.102	3.170	0.002
Social Influence → System Use	0.161	0.173	0.117	1.382	0.167
Facilitating Condition →System Use	0.404	0.392	0.109	3.714	0.000

Table 9 shows that the Path Coefficient values of all hypotheses are higher than 0. It indicated that each hypothesis provided a positive relationship.

6) F^2 test

After assessing the significant relationship between variables, the magnitude of the influence between variables also needed to be examined with Effect Size or F^2. It shows F^2 values greater than 0.02 as small, 0.15 as medium, and 0.35 as large. Values less than 0.02 can be ignored or considered to have no effect. The result of the F^2 test with smartPLS is shown in Table 10.

Table 10. F^2 test result

Variable	Path Coefficient
PE (Performance Expectancy)	0.033
EE (Effort Expectancy)	0.242
SI (Social Influence)	0.033
FC (Facilitating Condition)	0.284

Table 10 shows that there was no effect size considering large with $F^2 > 0.35$. However, there were variables with medium effect size showing F^2 between 0.15 to 0.35 influenced by Effort Expectancy (EE) on System Use (SU) and the influence of Facilitating Condition (FC) on System Use (SU). Meanwhile, the other two variables, Performance Expectancy (PE) on System Use (SU) and Social Influence (SI) on System Use (SU) had small effect sizes because the F^2 values are in the range of 0.02 to 0.15. The effects were ignored if those variables with F^2 were less than 0.02 since they had no significant effect. Therefore, the result of F^2 indicates that Effort Expectancy and Facilitating Conditions have a strong influence on System Use. On the other side, Performance Expectancy and Social Influence have a weak influence on System Use.

7) Coefficient of determination (R^2)

This test is conducted to explain the variance of each target endogenous variable (variables that are considered to be

influenced by other variables in the model) with a measurement standard of about 0.670 as strong, about 0.333 as moderate, and about 0.190 or below indicating a weak level of variance. The pattern in examining the coefficient of determination can be seen in Eq. (7).

$$R = \frac{[\sum(X-X_m)\times(Y-Y_m)]}{\sqrt{[\sum(X-X_m)2 \times \sum(Y-Y_m)2\,]}} \quad (7)$$

X: Data points in Data set X
Y: Data points in Data set Y
X_m: Mean of Data set X
Y_m: Mean of Data set Y

From the research results, it shows that R^2 value of variable U (Use) or system usage is 0.929 (92.9%). The result of the coefficient of determination value shows that the independent variables covering Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Condition show a strong contribution or influence on System Use. Thus, coefficient of determination values shows the level of contribution from independent variables to dependent variables.

8) Model fit

To meet the criteria for model fit, a good Standardized Root Mean Square Residual (SRMR) value is less than 0.05. The smartPLS model testing yielded an SRMR value is 0.057. It shows that the model was acceptable.

9) Hypothesis testing

Hypothesis testing involved Path Coefficients, *t*-statistics, and *p*-values to determine the significance between variables. The hypothesis testing was presented in Table 11.

Table 11 presents the results of hypothesis testing. The Path Coefficients value for the variable "performance expectation" in the hypothesis test is 0.138, indicating Path Coefficients > 0. The *t*-statistics value is 1.419 which was less than 1.96. The *p*-values value is 0.156 which is greater than 0.05. From these results, it can be concluded that performance expectation has a positive but insignificant effect on system usage. Next, the Path Coefficients value for the variable "effort expectation" in the hypothesis test was 0.324 indicating that Path Coefficients > 0, and the *t*-statistics value is 3.170, which is greater than 1.96, and the *p*-values value is 0.002, which is less than 0.05. From these results, it can be concluded that effort expectation has a positive and significant effect on system usage. Then, the Path Coefficients value for the variable "social influence" in the hypothesis test was 0.161 which means that Path Coefficients > 0, and the *t*-statistics value was 1.382 which was less than 1.96, as well as the *p*-values value is 0.167 which is greater than 0.05. From these results, it can be concluded that social influence has a positive but insignificant effect on system usage. Finally, the Path Coefficients value for the variable "facilitating conditions" in the hypothesis test is 0.404 which means that Path Coefficients > 0. The *t*-statistics value is 3.714 which was greater than 1.96. The *p*-values value is 0.000 which is less than 0.05. From these results, it can be concluded that facilitating conditions have a positive and significant effect on system usage.

Table 11. Hypothesis testing result

Variable	Path Coefficient	*t*-statistic	*p*-values	Impact	Hypothesis
Performance Expectancy → System Use	0.138	1.419	0.156	Not Significant	H_0 Accepted
Effort Expectancy → System Use	0.324	3.170	0.002	Significant	H_1 Accepted
Social Influence → System Use	0.161	1.382	0.167	Not Significant	H_0 Accepted
Facilitating Condition → System Use	0.404	3.714	0.000	Significant	H_1 Accepted

C. The Relationship of Moderator Variables on PIJAR's Effectiveness

The moderation testing stage is carried out using the bootstrapping procedure. Bootstrapping is useful as an alternative to parameter estimation to clarify doubt about meeting the assumptions in their data. It is conducted to determine whether the moderation variables could form a relationship between the exogenous and endogenous variables by strengthening or weakening the variables. The Path Coefficients, *t*-statistics, and *p*-values are also analyzed in the moderation testing to determine the significance value between variables. There are criteria for the Path Coefficients value, where if the Path Coefficients value > 0, the result indicated that the tested variable has a positive effect, whereas if the Path Coefficients value < 0, then the tested variable had a negative effect.

Table 12. Evaluation of moderating variables

	Path Coeff.	*p*-values	*t*-value	Significancy
Job × Performance Expectancy (PE) → Use (U)	−0.223	1.083	0.279	No
Job × Effort Expectancy (EE) → Use (U)	0.099	0.385	0.701	No
Job × Social Influence (SI) → Use (U)	−0.040	0.189	0.850	No
Job × Facilitating Condition (FC) → Use (U)	0.220	1.482	0.139	No
Age × Performance Expectancy (PE) → Use (U)	−0.051	0.248	0.804	No
Age × Effort Expectancy (EE) → Use (U)	−0.133	0.589	0.556	No
Age × Social Influence (SI) → Use (U)	−0.043	0.217	0.828	No
Age × Facilitating Condition (FC) → Use (U)	0.250	1.761	0.078	No
Gender × Effort Expectancy (EE) → Use (U)	0.015	0.170	0.865	No
Gender × Performance Expectancy (PE) → Use (U)	0.009	0.102	0.919	No
Gender × Social Influence (SI) → Use (U)	0.070	0.875	0.382	No
Gender × Performance Expectancy (PE) → Use (U)	−0.085	0.750	0.453	No

The interpretation of moderation testing was carried out through the following stages:

1) The first stage was intended to know the significant effect among variables. Moderation testing could be

said to have a significant effect if the *t*-statistics value in the hypothesis test was higher than 1.96 and the *p*-values value in the hypothesis test was less than 0.05.

2) The second stage was intended to examine the level of effect among variables, namely low, moderate, or high. This effect was seen from the F^2 value with the interpretation that moderation effects greater than 0.005 were low, 0.010 were moderate, and 0.025 were high.

In this model, the moderator variables were job group, age, and gender. The following Table 12 showed the results of the moderation testing using the bootstrapping procedure.

Table 12 shows that none of the *p*-values above are less than 0.05. Besides, none of the *t*-values were 1.96. Following the first stage of bootstrapping, these results show that there are no significant effects among variables. It indicated that job group, age, and gender did not have significant influence as moderator variables with performance expectancy, effort expectancy, social influence, facilitating condition on system use. Following the second stage of bootstrapping, the results of result of F^2 value (path coefficient) above show that some variables such as job and effort expectancy, facilitating condition, age and facilitating condition, gender and social influence on system use have high level of effect. On the other hand, the rest variables are categorized into low level of effect. Whether the variables above are high and low effect, but the variables do not influence other variables significantly.

V. Discussion

The present study reveals that the *Platform Indonesia Belajar* (PIJAR) is developed by using Waterfall model. The model provides clear step by step for developing the learning platform. In line with this matter, Waterfall model also provides minimum errors [63, 64]. It is because all processes are done sequentially starting from the process of requirement to maintenance. In addition, Waterfall model is easy to use and the step of development does not overlap [68]. Every step of the model provides clear direction in developing the platform. Moreover, the model is dynamic in doing software development [69]. The model can be used to develop a product-based technology which is currently needed nowadays to solve problems. Therefore, it can be seen that Waterfall model is suitable for developing technological product.

The technological product development using Waterfall model has been proven by some previous studies. Some educational fields use this model to develop information system to manage documents at the university [70]. In addition, this model also assists the development of learning management system for the senior high school [56]. Moreover, this model can be used to develop e-learning and lesson plan management [71, 72]. Apart from the educational purposes, the model also can be used to develop information system about citizen, complaints of violence woman and children, and web-based job training management information system [68, 69, 73]. The result of the previous studies and the present study show that Waterfall model is appropriate to develop technological product for different purposes.

The present study reveals that performance and social influence have no significant effect on the system use. Performance expectancy deals with personal accomplishment [54]. The result of the study indicates that whether or students have high expectation about the grades and learning achievement, it does not show the behavior of users in using the developed product. Their expectation does not influence the behavior of users in using the developed product. In addition, social influence deals with the influence contributed by the users' social circle to encourage them in using the developed product [55]. The result of the present study shows that social influence does not have significant effect on system use. It indicates that the influence of people surrounding the users do not significantly influence the behavior of users in using the developed product. However, expectancy and facilitating condition have significant effect on system use. Expectancy deals with the ease of product to be used. Regarding the result of the present study about expectancy, it indicates that the ease of developed product significantly influences the behavior in using the developed product. It shows that easier use of product makes user comfortable in using the developed product. Furthermore, facilitating condition deals with the belief of user about the product. In line with the findings about facilitating condition, it shows that users' belief influence their behavior in using the developed product. When the users believe that they have the ability to use the product, they tend to use the product frequently.

The result of the present study is similar to the previous study. It shows that effort expectancy facilitating conditions have significant effect on behavioral intention of using mobile banking [74]. However, different results are also showed by previous studies. A previous study shows that variables of performance expectancy and social influence have a significant influence on behavioral intention on mobile payments [75]. Not only that, performance expectancy, social influence, effort expectancy, and facilitating condition have significant effect on behavioral intention to use e-wallet [76]. Moreover, performance expectancy, social influence, effort expectancy, and facilitating condition have significant effect on intention of using communities-based online report management [77]. The results indicate that performance expectancy, social influence, effort expectancy, and facilitating condition can give different influence based on the different purpose of development.

The present study shows that the moderator variables such as gender, age, and job do not influence relationship between the performance expectancy, social influence, effort expectancy, and facilitating condition on the use of developed product. The results indicate that 1) there is no difference both men or women in the acceptance of learning platform; 2) there is no difference among children, teenagers, and adults in the acceptance of learning platform; 3) there is difference jobs in the acceptance of learning platform. The results of the present study have been supported by some previous studies which there is no influence of gender on the use of learning platform [78, 79]. However, another study about the use of webinar shows that age affects the use of webinar [78]. It can be seen that moderating variables may influence the use of learning platform based on their intentions.

VI. Conclusion and Future Work

The present study concludes that 1) learning platform (PIJAR) has been developed using Waterfall model; 2)

performance and social influence have no significant effect on the system use whereas expectancy and facilitating condition have significant effect on system use; and 3) there is no influence of moderator variables (job, age, and gender) between the performance expectancy, social influence, effort expectancy, and facilitating condition on the use of developed product. The developed product in this study is useful since performance expectancy is high; effort expectancy is medium; social influence is high; facilitating condition is high; and 5 system use is high from the respondents.

The result of the developed platform PIJAR is useful to be implemented in the education which is beneficial for all educational parties. The developed platform can be used by students, teachers, school administrators, and parents. Students can do exercises directly from the question bank released by the system. Not only that, the system also provides question banks, grades, attendance, school schedule, and learning content which help students in learning preparation and reflection. Besides, parents also can access school schedule, student grades, and school calendar which can be used to monitor their children learning. Moreover, school admins are able to manage tasks, content, virtual classes, syllabuses, class schedules, and announcements. It can be helpful for the admins to upload learning which can be known by students. Furthermore, teachers can manage learning schedules, syllabuses, classes, exam questions, tasks, content, attendance, learning outcomes, and grades. It will be easier for the teachers to keep the administration in the learning platform. This developed is unique since it can be connected to each educational party.

The results of the study give theoretical implication in which the model used in the present study gives an insight about the development of product related to the use of technology. In addition, practically the developed product can be implemented to help both administration and activity of teaching and learning process. This study has developed a product and examine the correlation of the variables. It is suggested to conduct further study about the practicality of the developed product to see its practicality in the education.

APPENDIX

Table A1. The root constructs of performance expectancy

Construct	Definition	Items
Perceived Usefulness [1]	The degree to which a person believes that using a particular system would enhance his or her job performance)	Using the system in my job would enable me to accomplish tasks more quickly. Using the system would improve my job performance. Using the system in my job would increase my productivity. Using the system would enhance my effectiveness on the job. Using the system would make it easier to do my job. I would find the system useful in my job.
Job-fit [2]	How the capabilities of a system enhance an individual's job performance.	Use of the system will have no effect on the performance of my job (reverse scored). Use of the system can decrease the time needed for my important job responsibilities. Use the system can significantly increase the quality of output on my job. Use the system can increase the effectiveness of performing job tasks. Use can increase the quantity of output for the same amount of effort. Considering all task, the general extent to which use of the system could assist on the job. (Different scale used for this item).
Outcome Expectations [3, 4]	Outcome expectations are related to the consequences of behavior. Based on empirical evidence, they are separated into performance expectations and personal expectations.	For pragmatic reasons, four of the highest loading items of performance expectations and three of the highest loading items of personal expectations from Compeau and Higgins 1995b) and Compeau et al. (1999) were selected as items in this study, as follows. If I use the system… I will increase my effectiveness on the job. I will spend less time on routine job task. I will increase the quality of output of my job. I will increase the quantity of output for the same amount of effort. My coworkers will perceive me as competent. I will increase my chances of obtaining a promotion. I will increase my chances of getting a raise.

Table A2. The root constructs of effort expectancy

Construct	Definition	Item
Perceived Ease of Use [80]	The degree to which a person believes that using a system would be free of effort	Learning to operate the system would be easy for me. I would find it easy to get the system to do what I want to do. My interaction with the system would be clear and understandable. I would find the system to be flexible to interact with. It would be easy for me to become skillful at using the system I would find the system easy to use.
Complexity [81, 82]	The degree to wich a system is perceived as a relatively difficult to understand and use).	Using the system takes to much time for my normal duties Working with the system is so complicated, it is difficult to understand what is going on. Using the system involves too much time doing mechanical operation (e.g., data input).

		It takes too long to learn how to use the system to make it worth the effort
Ease of Use [83]	The degree to which using an innovation is perceived as being difficult to use	My interaction with the system is clear and understandable. I believe that it is easy to get the system to do what I want it to do. Overall, I believe that the system is easy to use. Learning to operate the system is easy for me.

Table A3. The root constructs of social influence

Construct	Definition	Item
Subjective Norm [80, 84, 85]	The person's perception that most people who are important to him think he should or should not perform the behavior in question	People who influence my behavior think that I should use the system. People who are important to me think that I should use the system.
Social Factors [81]	The individual's internalization of the reference group's subjective culture and specific interpersonal agreements that the individual has made with others unspecific social situation	I use the system because of the proportion of coworkers who use the system. The senior management of this business has been helpful in the use of the system. My supervisor is very supportive of the use of the system for my job. In general, the organization has supported the use of the system.
Image [83]	The degree to which use of an innovation is perceived to enhance one's image or status in one's social system	People in my organization who use the system have more prestige than those who do not. People in my organization who use the system have a high profile. Having the system is a status symbol in my organization.

Table A4. The root constructs of facilitating conditions

Construct	Definition	Item
Perceived Behavioral Control [84, 86]	Reflects perceptions of internal and external constraints on behavior and encompasses self-efficacy, resource facilitating conditions, and technology facilitating conditions	I have control over using the system I have the resources necessary to use the system. I have the knowledge necessary to use the system. Given the resources, opportunities and knowledge it takes to use the system, it would be easy for me to use the system. The system is not compatible with other system I use.
Facilitating Conditions [81]	Objective factors in the environment that observers agree make an act easy to do including the provition of computer support	Guidance was available to me in the selection of the system. Specialized instruction concerning the system was available to me. A specific person (or group) is available for assistance with system difficulties.
Compatibility [83]	The degree to which an innovation is perceived as being consistent with existing values, needs, and experiences of potential adopters	Using the system is compatible with all aspects of my work. I think that using the system fits well with the way I like to work. Using the system fits into my work style.

CONFLICT OF INTEREST

The authors declare no conflict.

AUTHOR CONTRIBUTIONS

Ni Nyoman Parwati and I Made Tegeh directed the research method that will be used and validated the instrument that will be used for statistical analysis. I Gede Wawan Sudatha contributed to the systematic validation and software validation. Gede Arka Puniatmaja finalized the paper. All authors have approved the final version.

FUNDING

This research was supported by Education Science Doctoral Program of Universitas Pendidikan Ganesha, and Digital Business Division of PT. Telkom Indonesia. Their support and consideration are highly appreciated.

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