



## Journal of Advanced Research in Applied Sciences and Engineering Technology

Journal homepage:  
[https://semarakilmu.com.my/journals/index.php/applied\\_sciences\\_eng\\_tech/index](https://semarakilmu.com.my/journals/index.php/applied_sciences_eng_tech/index)  
ISSN: 2462-1943



# Technology-Based Education Marketplace Software for Adult Learning

Achmad Hufad<sup>1</sup>, Purnomo<sup>1,\*</sup>, Nani Sutarni<sup>2</sup>, Mohamad Hadi Ali Mutaman<sup>1</sup>

<sup>1</sup> Department of Community Education, Faculty of Sciences Education, Universitas Pendidikan Indonesia, Bandung, 40154, Indonesia

### ABSTRACT

The objectives of this research are: 1) to describe the empirical conditions of learning needs at the Community Learning Centre (CLC) in Indonesia; and 2) to explain how the marketplace model is used to address learning needs. Benefits from the education marketplace can assist learners in meeting their learning needs, connecting to various learning materials, and ensuring they can study and remain productive. From December 2022 to May 2023, the research methodologies used, i.e., mixed methods with qualitative and quantitative approaches, were carried out to 228 CLC students in 77 CLCs all over Indonesia. The findings of this study have resulted in prototypes of physical models and narrative models that can be used to address the community's learning needs in the CLC institutional context via the Education Marketplace software Smart Store. As an adult learner, the intelligent store marketplace has given adults the ability to select roles, i.e. as a learning resource. This study suggests that technology can enable and enhance lifelong learning, and that everyone can learn to meet their knowledge demands through technology.

#### Keywords:

Community learning center; education marketplace; learning needs; learning resources

## 1. Introduction

Technology-Based Education Software for Learning is a model for providing education with the help of technology to facilitate access and learning interactions [1]. A marketplace is where users meet with educational experts to interact with each other; the facilities obtained are paid or unpaid. The education marketplace with the product name Toko Pintar at <https://toko-pintar.com> can provide an answer to everyone's difficulty in finding experts in the field of education and training.

The development of education in the 21st century is different from that of education in the previous century [2-5]. Today, technology plays a vital role in the progress and development of learning activities [6]. Rapid information and communication technology developments, such as laptops, computers, and mobile phones, mark the 21st century [7]. Along with the increasingly rapid development of technology, the internet has experienced extraordinary developments.

The rapid development of information and communication technology supports cultivating lifelong learning [7-20]. Everyone can continue learning without having to sit as a student. Input knowledge can be obtained from various learning sources without reducing the essence of the nature

\* Corresponding author.

E-mail address: [purnomo@upi.edu](mailto:purnomo@upi.edu)

<https://doi.org/10.37934/araset.62.2.85100>

of learning. Thus, information can be obtained up-to-date at any time. This is in line with the nature of community education, namely providing a learning environment, identifying societal needs through face-to-face and physical encounters, and sharing experiences with other people or other groups.

Several ways of looking at the results of research on community education regarding current developments are always open, especially in implementing access to education for the benefits of community empowerment [8, 21-24]. Public education is about acting in concert with people, enabling them to analyze their situation and achieve political change, giving society power [25]. Therefore, the essence of public education regarding current technological developments is in line because technology can make it easier for someone to interact with, including adults [26-27]. The results of this research concluded that the majority of community empowerment participants are mature community groups with diverse needs, desires, experiences, and self-concepts, all of which can be used as a basis for designing community empowerment programs based on the needs of adults through the use of technological learning resources.

Fulfilling learning needs as part of designing community empowerment programs is an essential stage in the learning process at the Community Learning Center (CLC), leading to student changes. Learning needs are carried out through reflection, identifying deficiencies in knowledge or skills, and creating an action plan to meet these needs [27]. A learning needs assessment is carried out to obtain information that can be used to determine learning objectives to close the gap between what students currently know and what they need to know to achieve competency [27]. Knowing the learning needs of students at CLC, it will be easy to determine the learning conditions that must be created, what content should be given, and what strategies, techniques, and methods are suitable for use.

Learning resources are essential components and have a significant role in improving student learning quality. According to one source, learning resources are all the things that students can use to learn, whether they are used alone or together, usually in a casual setting. These are: i) messages; ii) people; iii) materials; iv) devices; v) techniques; and vi) settings [7, 28].

Selection of learning resources criteria for selecting learning resources are: i) compatibility with learning objectives; ii) access to local sources, i.e., the need to buy, create, or otherwise acquire the learning resources in question if they are not present in existing sources; iii) availability; are they available? Adequate funds, human resources, and facilities to procure these learning resources; iv) factors related to flexibility, practicality, and resilience of the relevant learning resources for a relatively long period; and v) cost-effectiveness over a relatively long period [29].

Technological advances are increasingly reaching all corners. In the past, technological advancements were associated with city dwellers' facilities; today, people from all walks of life- children and adults alike- can easily enjoy these technological advancements. Indirectly, consciously or unconsciously, everyone has used technology for learning, especially when using mobile phones and surfing the internet. Various types of information can be found; they are also connected to the larger community. This also affects the information exchange rate across places, times, and ages [30].

Based on this concept, learning needs and resources require databases to collect information and data. The IT perspective shows that databases can be integrated into one, making it easy to analyze and determine information needs. For example, the Hallodoc website, Facebook application, etc. rely on databases to be compiled and analyzed. For example, learning resources are significant in community education because they will enrich information. However, there are still many unpublished community leaders or community empowerment practitioners (personal learning sources); this needs to be inventoried for expertise in their fields to become resource persons, consultants, and learning resources for people in need. Therefore, public education can utilize

information technology as a medium of media liaison or communication between students, experts, or resource persons. This moment of communication can be used to ask incomprehensible questions. Thus, students can get experts or resource persons' feedback [31].

Therefore, researchers need to integrate these two concepts into one IT-based database to facilitate data collection and search. Automatically, the user's learning needs will be measured, and the results will be directed to various learning resources. Apart from that, experts will be gathered on one site to learn from each other and search for information.

Education Marketplace is an online environment that connects students with quality education providers. Education Marketplace can be a platform that allows users to become experts in a field by uploading certificates, adding articles, and filling out profiles with all the necessary information. The main goal is to allow students to consult with experts, and experts can chat with people and help them gain the knowledge they seek [32]. The existence of an education marketplace can help students meet their learning needs, meet them on various educational platforms, and ensure students can learn and remain productive.

Based on this, there is a need for an education marketplace model to meet the educational learning needs of the community at CLC in Indonesia. Mixed research methods (quantitative and qualitative) were used in this research to show trends in the use of technology and the implementation of educational marketplaces [33]. The instruments used include questionnaires, interview guidelines, observation, and documentation guidelines.

The objectives of this research include: i) describing the empirical conditions of learning needs in PKBM in Indonesia; and ii) describing the application of the education marketplace model to meeting learning needs. The educational marketplace model allows users to deepen their knowledge of a particular field by using courses offered by professionals in various fields to meet their learning needs. The novelty of this research is empowering a new adult learning style by utilizing digital learning resources in the form of an educational marketplace called the smart shop at <https://tokopintar.com/>, which has been needed for adult learners.

## **2. Literature Review**

### *2.1 Education Marketplace*

Based on the background of study, it is necessary to have an education marketplace model to meet the learning needs of community education at CLC in Indonesia. The education marketplace model allows users to deepen their knowledge of a particular field by using courses offered by professionals in various fields to meet their learning needs.

The objectives of this research include: i) describing the empirical conditions of learning needs at CLC in Indonesia; and ii) describing the application of the education marketplace model to meeting learning needs. The concept of the Education Marketplace has gained prominence in recent years as an innovative approach to enhancing education delivery, facilitating access to diverse learning opportunities, and fostering competition and choice in educational services.

The Education Marketplace concept draws inspiration from market principles applied to education [34]. It has roots in economic theories of competition, consumer choice, and the free market. The Education Marketplace is a dynamic and evolving concept with the potential to reshape education systems globally [35]. As education stakeholders grapple with the complexities of market-driven education, it is imperative to balance competition and equity, innovation and quality assurance, and choice and inclusivity to pursue improved educational outcomes for all.

Education Marketplace is a platform that allows users to become experts in a field by uploading certificates, adding articles, and filling out profiles with all the necessary information. Its main goal is

to allow learners to consult experts, and experts can chat with people and help them get the knowledge they are looking for [32]. The existence of an education marketplace can help students to meet their learning needs, meet on various educational platforms, ensure that students can learn and remain productive. Features that must be available on the Education Marketplace are [33]:

- i. **Verification System:** Education providers must verify experts to prove credibility. Education providers must manually verify each user claiming to be an expert, reviewing certificates and work experience to confirm their status. Thus, students can be sure to communicate only with experts.
- ii. **Video Calls:** Chat with an expert supports the video call function, with the possibility to share the screen if the student needs an in-depth consultation.
- iii. **Knowledge Base:** Learners learn to navigate the platform, find answers to common questions, and check things that must be done during the lesson.
- iv. **Mobile Apps:** Cross-platform mobile apps are a must-have as the world goes mobile in the education marketplace. The level of comfort we have to provide users is the possibility to manage profiles, schedule, make chats or video calls, and upload necessary files, all in the mobile version, without compromising quality.

## *2.2 Learning Needs*

Based on this, it is necessary to have an education marketplace model to meet the learning needs of community education at CLC in Indonesia. The education marketplace model allows users to deepen their knowledge of a particular field by using courses offered by professionals in various fields to meet their learning needs [34]. Understanding and addressing learning needs is fundamental to adequate education and training. Learning needs refer to the specific requirements and gaps in knowledge, skills, and competencies that individuals or groups have, and they play a pivotal role in shaping educational strategies and interventions.

Community education provides a learning environment and identifies needs in society, not only through face-to-face and physical encounters but also when the community shares experiences with other people or groups. Society controls decision-making, and the process is rooted in emancipatory, value-centered [36]. The starting point of community education is the experiences of the participants (community) who are faced with a process of critical reflection. Stated that community education has interrelated objectives for the participants, including: i) the acquisition of skills, knowledge, and development of personal potential; and ii) social transformation, community, and empowerment [37].

The preparation of community education programs is directly related to efforts to collect data and information on community learning needs. Needs are something that must be met, something that includes desires, wishes, hopes, or circumstances. Learning needs represent the gap between what the learner wants to gain from the learning experience and his/her current knowledge, skills, and enthusiasm. Learning needs assessment is a systematic process of obtaining information to determine learning objectives to close the gap between what learners know and what they need to know to achieve competency [38-43].

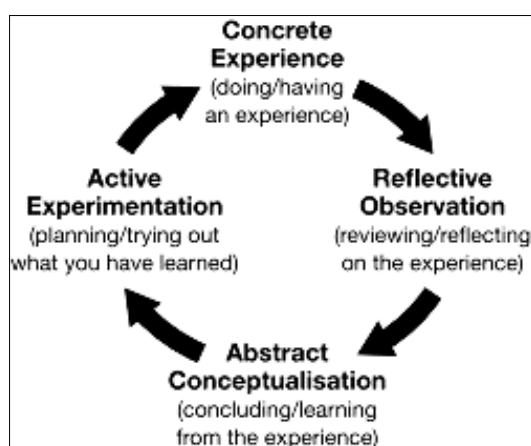
Provides guidelines for conducting learning needs assessments based on learning activities, namely:

- i. **Gap or discrepancy analysis** requires students to compare their performance with the competencies stated through self-assessment or objective testing.

- ii. Continuous reflection on students' lives allows for identifying good performances and those that need improvement. This can be facilitated online or face-to-face.
- iii. The peer review allows the "critical friend" to provide feedback on the trainee's current practice. This can be done in various formats, including direct observation or multidisciplinary assessment through feedback from multiple sources.
- iv. Fundamental event analysis: This is a powerful tool for identifying learning needs and a significant motivator for addressing them.
- v. Practice review: Practice review such as record-keeping and references can be used for improvement [27].

An integral part of conducting a learning needs assessment is adopting reflective practice. Repeated cycles allow continued professional development of professional knowledge, skills, and attitudes. Reflective practice not only helps identify learning needs but also promotes the development of critical thinking. The model suggests that more than having experience alone is needed to promote learning. Instead, learners must reflect on their experiences and formulate connections between theory and action to enhance learning [27].

Kolb's model emphasizes that effective learning involves a continuous cycle of experiencing, reflecting, conceptualizing, and experimenting. Learners do not linearly progress through these stages; they often revisit and revise their understanding based on new experiences and reflections. The model highlights that more than merely having an experience (the CE stage) is required for meaningful learning. It is the process of reflecting on that experience (the RO stage), drawing insights and abstract concepts (the AC stage), and applying them in new situations (the AE stage) that leads to a more profound and sustainable form of learning, as shown in Figure 1.



**Fig. 1.** A four-stage cycle model of reflective practice based on experiential learning

### 2.3 Community Learning Center in Indonesia

CLCs serve as crucial hubs for lifelong learning in Indonesia [44]. They offer a variety of educational programs, including basic literacy and numeracy, vocational training, health education, and community development initiatives. CLCs are pivotal in bridging the education gap, especially in rural and underserved areas with limited formal educational institutions. Furthermore, CLCs foster a sense of community ownership and participation in education, contributing to social cohesion and empowerment.

The Indonesian government has recognized the importance of CLCs in fulfilling the educational needs of marginalized communities [45]. Various policies and programs have been introduced to

support CLCs. The National Program for Community Empowerment and the Community-Based Education Program are examples of initiatives that provide funding and capacity-building support to CLCs. These policies demonstrate the government's commitment to promoting access to quality education through CLCs [46]. Despite the progress in CLC development, challenges persist. Funding constraints, the varying quality of CLC programs, and the need for improved teacher training are some issues that require attention. Additionally, the COVID-19 pandemic highlighted the importance of digital literacy and the need for CLCs to adapt to remote learning.

As we delve deeper into the literature, it becomes evident that CLCs have been instrumental in creating a more inclusive and accessible education system in Indonesia [47]. However, further research is necessary to explore the evolving role of CLCs in the face of changing educational paradigms and technological advancements. Additionally, understanding the impact of CLCs on community development and empowerment is a crucial study area.

One of the fundamental principles underlying CLCs in Indonesia is local empowerment and decision-making [48]. These centers often involve local communities in the planning, managing, and evaluating of educational programs. This approach fosters a sense of ownership and participation among community members, making CLCs more responsive to local needs. CLCs are known for their flexibility and adaptability. They can tailor their programs to suit the specific needs of the communities they serve [49]. For example, in remote and rural areas, CLCs may offer agricultural training and literacy programs, while in urban settings, they may focus on digital skills and entrepreneurship.

CLCs have been instrumental in promoting inclusivity and equity in education. They target marginalized and underserved populations, including indigenous communities, people with disabilities, and impoverished people. By providing accessible and relevant education, CLCs contribute to reducing educational disparities in Indonesia. CLCs often collaborate with stakeholders, including local governments, non-governmental organizations (NGOs), businesses, and universities. These partnerships help secure funding, expertise, and resources to support CLC programs. They also enhance the quality and scope of educational offerings.

### **3. Methodology**

This research used a descriptive, qualitative, and quantitative research approach. Qualitative research aimed to explain the conditions of use of education marketplace software, while the descriptive quantitative approach aimed to show the dominance of answers in the form of percentages and non-test hypotheses [33].

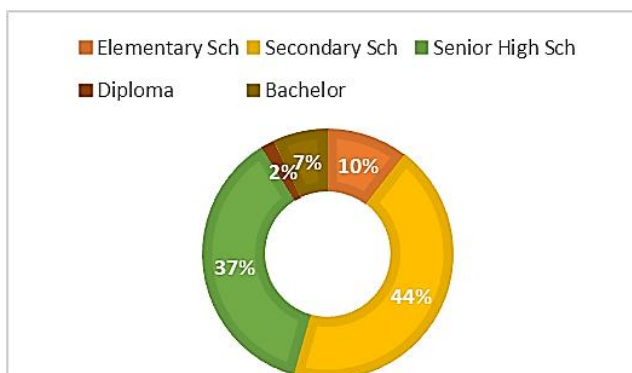
This research was conducted to 228 CLC students at 77 CLC institutions in Indonesia, from December 2022 to May 2023. The researchers' considerations in determining these participants included: i) attending educational programs at CLC regularly; ii) being able to describe empirical conditions surrounding the use of smart shop software; and iii) mastering and understanding technology in the learning program at CLC. Data collection techniques in initial research and research implementation included: i) participant observation; ii) interviews; iii) questionnaires; and iv) documentation studies. These four techniques complemented each other and filled in the information needed by researchers in answering the research problems.

## 4. Results and Discussion

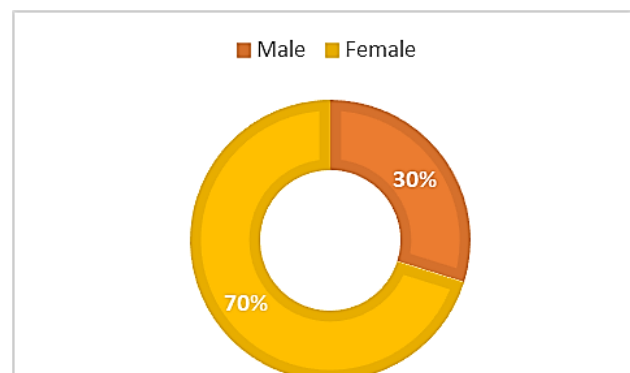
### 4.1 CLC Empirical Conditions in Indonesia

Based on the CLC conditions mentioned above, research on the digitalization of andragogy aims to determine the profile of adult technology use. The total number of respondents was 228 students, as follows: students with the most recent junior high school diploma (44%) and high school diplomas (37%) make up the majority of the student profile based on educational background. This demonstrates that educational backgrounds between junior high and high school predominate among CLC students. The general description of the profiled CLC students based on educational background is displayed in Figure 2.

Women (70%) and men (30%) make up the majority of CLC students' gender profiles. Several programs implemented by CLC facilitate women in economic development and household management. The general description of the CLC students based on gender is displayed in Figure 3.

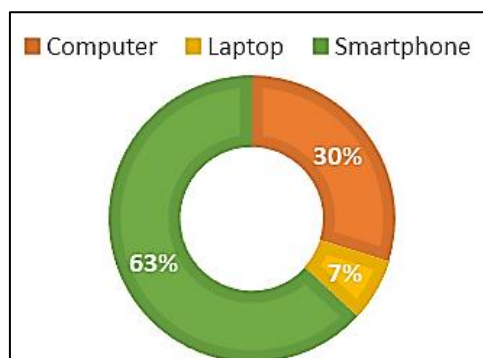


**Fig. 2.** Profile of CLC students based on educational background



**Fig. 3.** Profile of CLC students based on gender

Profile of technology users based on Internet access media: The majority use smartphones (63%) and desktop computers (30%). Thus, many students have used smartphones for various needs and activities, including studying at CLC. Learning activities can be integrated more functionally if they are compatible with smartphones. The general description of the technology user based on internet access media is displayed in Figure 4.

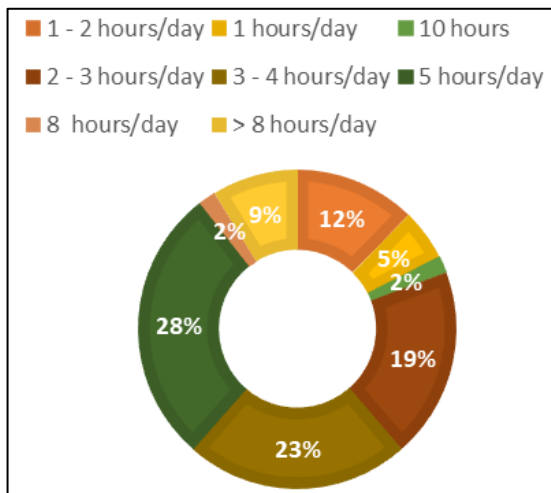


**Fig. 4.** Technology user profiles based on Internet access media

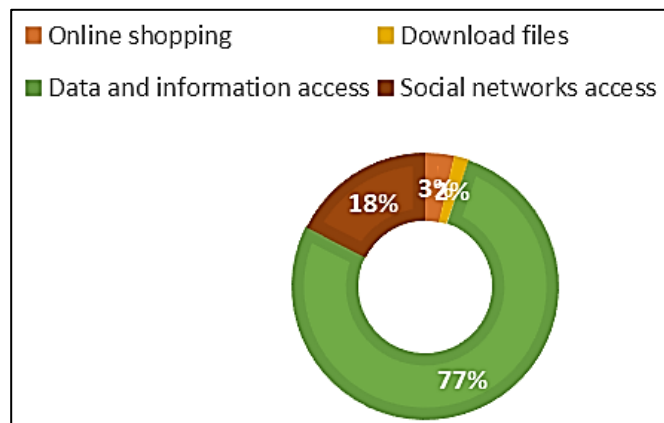
The profile of technology users based on the average length of internet access per day shows the most time is 10 hours per day (28%), then 3–4 hours per day (23%), and 2-3 hours per day (19%). So, look at the duration of using or accessing the internet. In that case, students are included in the

frequent category because the duration of using or utilizing technology is quite long. The general description of the technology user based on the average length of internet access per day is displayed in Figure 5.

Profiles of technology users based on priority needs to access the internet are used to access data and information (77%) and social networks (18%). So, learning needs are very appropriate if integrated with internet access and its applications because students are used to it. The general description of technology users based on priority needs to access the internet is displayed in Figure 6.



**Fig. 5.** Technology user profiles based on the average length of internet access/day



**Fig. 6.** Technology user profiles based on priority needs to access the internet

In a short period of time, information and communication technology (ICT) has become one of the foundations for modern society, inseparable from the world of education. CLCs in Indonesia have adapted to the conditions of the COVID-19 pandemic so that learning prioritizes using the digital world of ICT in their learning systems. The CLC learning curriculum must be able to support the growth of the current educator competencies [50], which include: i) understanding of ICT in education; ii) curriculum and assessment; iii) pedagogy; iv) information and communication technology; v) organization and administration; and vi) professional teacher learning. Technology can strengthen and enhance adult learning education by providing a learning environment with resources and tools students can explore and encouraging more independent and adult-centered learning [51-53]. CLCs in Indonesia have utilized technology to support the sustainability of adult learning education. This also helps CLC students because learning is considered more cooperative, participatory, and collaborative.

Learning at CLC, based on digital adult learning education, is the first step in revitalizing learning [54-56]. Educators package the implementation of the learning program to encourage the transition from the context of pedagogical practice to learning based on digital adult learning education. Several researchers' findings show that adult learning education is a strategic approach to digital learning for meeting the learning needs of community education [51, 54, 57-59]. Digital-based adult learning education has been implemented in CLCs in Indonesia. However, 20% of CLCs are still not ready to digitize to meet their learning needs.



## 4.2 Learning Resources in Education Marketplace

People have a variety of information demands when it comes to meeting their needs and solving their problems. As a result, software that can reconcile community and information needs via the Education Marketplace Model is critical. This software will direct you to information sources that can provide information, consultation, and educational services related to 35 areas of expertise and more than 50 areas of expertise, including health, economics, education, politics, religion and culture, and others.

The Education Marketplace model is known as "Toko-Pintar," which means that this application especially becomes a marketplace for bringing together expert information sources or specialists in their domains, as well as digital information sources that can be downloaded and studied at any time. After meeting those in need of services (users) with experts or information sources, users (beneficiaries) can communicate with each other for mutual consultation and education via chatrooms with experts or access other digital resources in this application, as shown in Figures 7 and 8.



Fig. 7. Use cases for users (community)

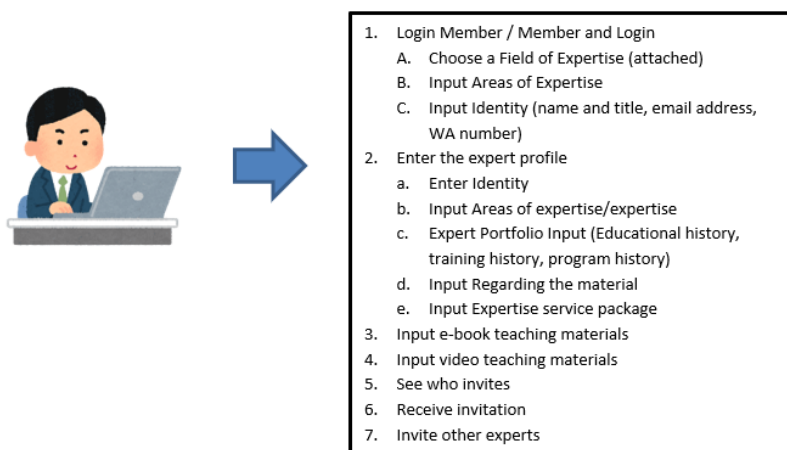


Fig. 8. Use cases for experts

## 4.3 Conceptual Model of Education Marketplace

In this study, the prototype starts with a design as a fundamental framework and reference, which is then compiled into a more operational model to make it easier to implement. The professional

digital expert software prototype (<https://toko-pintar.com/>) is the development of an information and communication technology (ICT) approach as a strategy for determining the need for effective learning programs based on the abilities of CLC students, the majority of whom are aged 30 and up, through the use of smartphones and computers. The process of utilizing learning resources, particularly for adult users, which include, on average, the Baby Boomers (1946-1960) and Generation X (1961-1980), has the ability to use IT that is neither complex nor complicated. Figures 9 and 10 show a general description of display design, one of the classes in the education marketplace web.



Fig. 9. Display design one of the classes in the education marketplace web

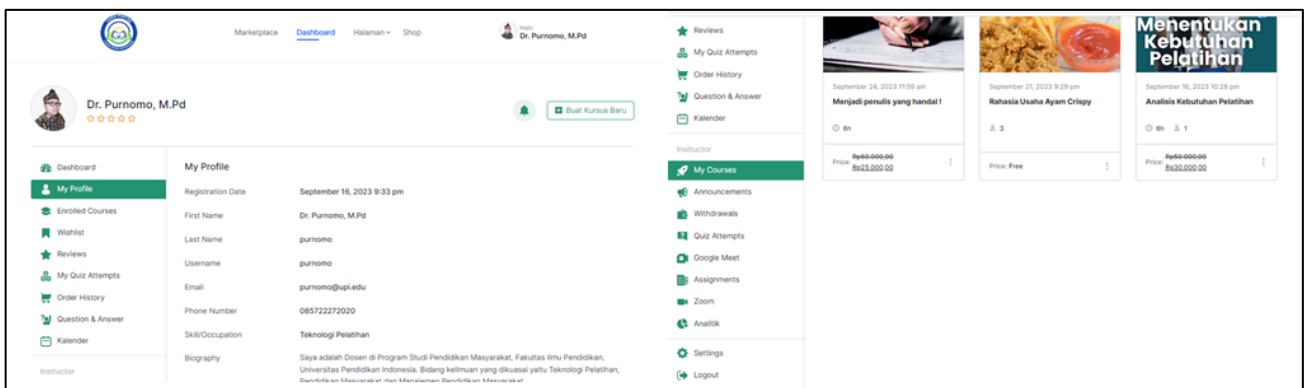


Fig. 10. A view of one of the online class instructors who is able to organize learning

Empirically, technological capabilities in this generation require adaptation efforts in the form of training (learning) due to the demands of the times, especially the Industrial Revolution 4.0. The facts illustrate that the challenges of the Industrial Revolution 4.0 have changed the performance or learning mechanisms of CLC students. First, high internet capabilities require students to be able to master the use of the internet, at least by utilizing their smartphones and accessing search engines such as Google and email. "Internet of Things," at this time, has become a strategic line in processing information and accessing information. Second, the Industrial Revolution 4.0 created sensors that record everything 24 hours a day; this information concerns human performance. For example, students can take advantage of learning opportunities by utilizing technology. Third, searching and processing data can be accessed quickly via the internet with data stored in the database; this stage can also be called cloud computing. Fourth, technology currently functions as machine learning. These machines can learn, with the ability to make mistakes, so that they quickly make corrections to improve subsequent results.

CLC students can use these four facts to complement their current competencies. As CLC students with an age range of 30 years and above, the form of technology adaptation is delivered through several stages, namely by first explaining the concept of technology and its functions, meaning that there are still many CLC students who do not understand the concept of technology because the majority of CLC students are given training and counselling in the form of theory only and have never attended debriefing on technology, then followed by explaining the negative and positive effects of technology that include concerns about displaying private matters to the public, essential data about certain families to keep secret, and wise use of social media relevant to their needs.

The psychological and physiological conditions of these adults influence their learning needs. Psychological conditions show that adult learning satisfaction is based on fulfilling life's needs, which are accommodated through learning. Meanwhile, many physiological conditions affect learning interactions based on students' physical abilities. The learning needs of adults need to be fulfilled through news, data, and information forums in order to be able to express opinions, advice, and learning outcomes in the form of life changes.

Currently, the various learning needs of adults to improve competence need to be accommodated so as to avoid difficulties in accessing them. Since COVID-19 hit Indonesia in 2020, several popular online training and educational services have been introduced. This habit has become entrenched until now, and some of the students at CLC have adapted a lot to online learning conditions. Thus, some conventional education services have been transformed into online and blended ways. On this basis, educational services for adults must be accommodated to meet their competence and life needs. Technology is one of the solutions to this problem, namely facilitating adults to choose the proper education and training services to meet their needs. Through e-training or ICT-based training, students can take part in and study training with test-measuring devices independently and can obtain a certificate as a reward for the training.

The application of e-training or digital learning resources for CLC students is based on their choice of knowledge, skills, or competency needs. In short, this prototype is an option that can be tested on CLC students with the age criteria of 30 years and over; this is based on the average user of CLC students in the age range of 30-60 years. The government does not directly select CLC students through recruitment, but they attend based on awareness of the existing environmental and social conditions.

The steps taken by the researcher to develop this prototype are: i) identifying the learning needs of adults; ii) determining the elements specified in supporting the system from the Education Marketplace Software model; iii) compiling training that will be carried out to students with relevant digital literacy levels; iv) carrying out data collection by utilizing software; and v) carrying out prototype validation with community education experts, practitioners, and colleagues. The characteristics of the prototype developed include: i) using web-based software with an internet connection; ii) taking advantage of smartphones; iii) the involvement of experts to register as instructors or resource persons; and iv) the involvement of students to register as training participants.

In general, in the development of this prototype, it was agreed upon the criteria for participants to be included, including:

- i. Mastering basic use of smartphones and computers, or one of them;
- ii. Being a member of CLC Learners or society at large; and
- iii. Willing to follow the digital learning flow provided on the e-training website.

The assumptions of this digital-based Education Market Place Software prototype will affect the improvement of the competence of CLC students, especially in meeting their life needs and

competencies. This e-training model is applied by personal self-registering as a member of the software, both as an instructor or expert and as a student.

The perspective of the software prototype on increasing the competence of CLC learners follows these principles:

- i. Self-Assessment: evaluation can be carried out independently, measuring one's abilities after learning or gaining experience when learning [60].
- ii. Relevance: the formulation of measurable program planning based on community goals or needs.
- iii. Effectiveness and efficiency: the formulation of community empowerment program planning can reduce time and costs.

Community education provides a learning environment and identifies needs in the community through not only face-to-face and physical encounters but also the community sharing experiences with other people or groups. The community controls decision-making, in which the process is rooted in emancipation. The starting point of community education is the experiences of the participants (community) who are faced with a process of critical reflection [37].

Community education runs naturally, focusing on supporting successful learning through guidance, mentoring, feedback, and dialogue. This is one of the strategies for a flexible problem-solving approach, participatory democracy, and it demonstrates the importance of community education in transforming society. Community education takes place in groups, and group-based learning approaches are at the heart of its activities. The learning process takes place in groups, with conversation, interactive involvement, and experience sharing. As a result of this process, personal and social relationships can be developed as a manifestation of self-actualization [61].

As a result, when the relevance of public education to Indonesian society is investigated in greater depth, it is found to be very closely tied. Deliberation in consensus is valued in Indonesian society, which is noted for its gotong-royong, tolerance, and good social ties. According to this explanation, a person's empowerment is determined by the individual. One person's power situation will be vastly different from another's. Empowerment happens in three stages: i) the dependency stage; ii) the independence stage, in which the individual can make his or her own decisions; and iii) the interdependence stage, in which the individual recognizes that people cannot live alone [62].

## **5. Conclusions**

The results of this study have produced a physical model prototype and a narrative model that can be used to address the learning needs of community education at CLCs in Indonesia using a digital method using Education Marketplace software named Toko Pintar. This is the development of an information and communication technology (ICT) approach as a strategy for determining the need for an effective learning program based on the abilities of CLC students.

## **Acknowledgement**

The Institute for Research and Community Service Universitas Pendidikan Indonesia funded this research.

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