Total learning experience (TLE) on the cloud with an intellectual repository to enhance digital empathy and literacy skills

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ABSTRACT: The total learning experience (TLE) model on the cloud with an intellectual repository is a tool that can be employed to promote limitless self-learning by means of active learning. In this model, learners are encouraged to have real experiences and face challenges leading to the creation of new knowledge and enrichment of their existing knowledge. This model can also be applied in other contexts, which can be done by integrating the concepts of technologies and new platforms offering experience-based instruction to create new ways of instructional design. Moreover, the model can be utilised in the current instruction management approach that usually focuses on continuous learning with the aid of technology. The results of this research can be used as a guideline for the design and development of the TLE system using an intellectual repository, which encourages experiential learning and generates new knowledge through self-learning with the aid of digital technology. In addition, this kind of learning promotes the exchange of knowledge through on-line social networks, thus contributing to the development of digital empathy and literacy skills, and the creation of a learning society.

Keywords: Total learning experience on the cloud, intellectual repository, digital empathy, literacy skills

INTRODUCTION

The development of information technology is proceeding in a rapid manner, both in the government and private sector. Many organisations have been making use of information technology to develop and manage their internal systems and are using it as sources of knowledge and learning for their personnel, which is compliant with the policies and guidelines intended to promote lifelong learning and self-learning [1].

To become a learning organisation, the personnel in that organisation should, without limitation of time and place, have freedom to learn, be able to create a variety of knowledge, and share their knowledge among each other in order to enhance their competence and potential needed for business progress.

The ultimate goal, once the knowledge management concepts in higher education institutions are applied, is to become an institution of academic excellence. Therefore, the personnel in these institutions should be encouraged and provided with opportunities to showcase their potential and competence, work together, exchange knowledge with one another, and create new knowledge that can be used to improve their work processes.

To generate new knowledge, the up-to-date learning environments are required. The learning of the new generation in a digital era is usually related to the search for knowledge by means of technologies on the cloud or *cloud technology* [2], which is commonly employed as a main tool to generate new knowledge on the basis of innovation and digital technology.

Total experience (TX) is a business strategy with the overall user experiences combined that reflect the total image of the organisation. It is an in-depth exploration of different experiences by linking them together and finding out what changes are needed for improvement, satisfaction and success. These experiences consist of customer experience (CX), employee experience (EX), user experience (UX) and multi-experience (MX) [3]. In short, the goal of TX is to stimulate customers and employees to have more confidence, more satisfaction, more loyalty and more support.

Experiential learning is a kind of learning model that promotes self-learning by means of active learning, which encourages learners to have real experiences and face challenges, leading to the creation of new knowledge built on their existing knowledge. Kolb presented a theory of learning cycle with four steps known as Kolb's experiential learning model (ELM), including:

1) concrete experience;
2) reflective observation of the new experience;
3) abstract conceptualisation;
4) active experimentation [4].

Cloud technology is a computing technology with a structure of information and communication technology that can extend itself automatically, providing services to a huge number of clients. Its operation relies on the numerous resources available on the Internet. Once connected to the Internet, the user can access any resource in this huge network, regardless of the user's origins or current location, their remoteness or closeness to the source [2][5].

Digital empathy and literacy skills are the skills related to the understanding and use of digital technology. Digital empathy refers to the ability to use digital technology in a responsible, ethical and socially acceptable manner in consideration of other users, while digital literacy skills include the ability to find, critically appraise, utilise and create new knowledge in a digital environment All of that can lead to creating a learning and sharing society based on the utilisation of information technology [6-8]. These skills are considered the essential skills for the 21st Century.

In view of the current use of cloud technology and the necessity to enhance digital skills and digital empathy, the authors of this article developed a total learning experience model on the cloud with an intellectual repository. The principles, concepts and theories referred to in this introduction, have been applied to design and develop the model, which can be used as a tool to promote limitless self-learning by means of active learning.

As mentioned above, this approach will encourage learners to acquire knowledge and skills through real experiences and challenges, ultimately leading to new knowledge and digital skills creation, including digital empathy and digital literacy.

RESEARCH OBJECTIVES AND HYPOTHESES

The objectives of this research are as follows:

- To synthesise the conceptual framework of the total learning experience (TLE) model on the cloud with an intellectual repository.
- To develop the TLE model according to the framework.
- To develop the TLE process according to the framework.
- To evaluate the results of the developed TLE model and process.

The hypotheses of this research relate to the suitability of the TLE development, which include:

- The suitability of the developed TLE model on the cloud with an intellectual repository is at a high level.
- The suitability of the TLE process on the cloud with an intellectual repository is at a high level.

RESEARCH METHODOLOGY

This research concerns the design, development and evaluation of the TLE model and process, and the details relating to participants, data collection, analysis and methodology are outlined below.

Participants

There were 20 participants included in this research, derived by means of purposive sampling, all of them experts from different institutions with academic positions, and with specialisation in the design and development of instructional systems and Web applications. Each of them had at least five years of work experience.

Data Collection and Analysis

To develop the TLE model including the TLE process, the researchers employed the following research tools: 1) activity plans in learning environments on the cloud based on total learning experience; 2) evaluation form on the TLE model; and 3) evaluation form on the TLE process. The statistics used for data analysis included the mean and standard deviation of the data.

Methodology

The methodology of this research concerns the design and development of a learning model, and it is based on a system approach [9][10]. This approach includes the principles of instructional design, learning process and systematic development, as well as the systems development life cycle (SDLC) [11]. Additionally, the principles, concepts and theories of the total learning experience [3][4] were applied in the model's development. The total learning experience is a combination of total experience and experiential learning. The research methodology can be summarised in four stages as shown in Figure 1.
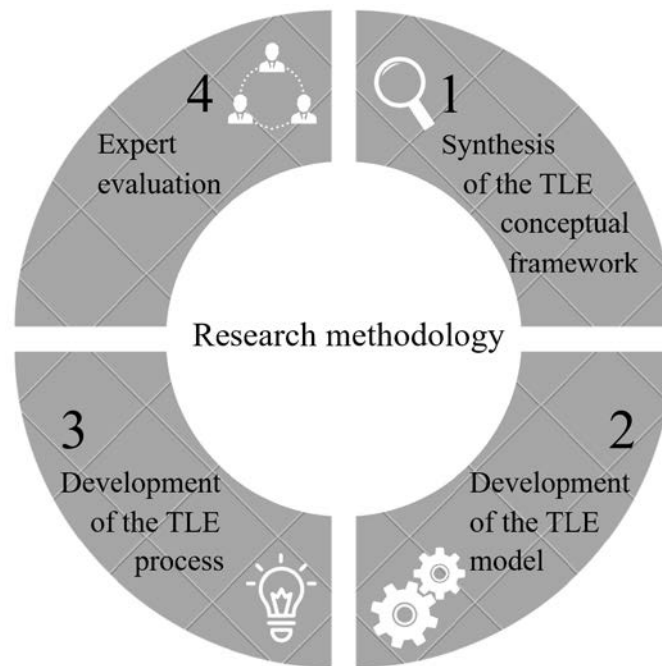
Figure 1: Methodology.

Stage 1: Synthesis of the TLE conceptual framework.

This stage involved a literature review, covering relevant theories, current advances and developments reported in articles and other documents which were required for the TLE conceptual framework. The theories adopted herein comprise a system approach [9][10], total experience [3], experiential learning [4], cloud technology [2][5], intellectual repository and digital empathy and literacy [6-8]. In this stage, the researchers constructed a conceptual framework that could be used as a guideline to design and develop the TLE model and process. The TLE framework is shown in Figure 2.
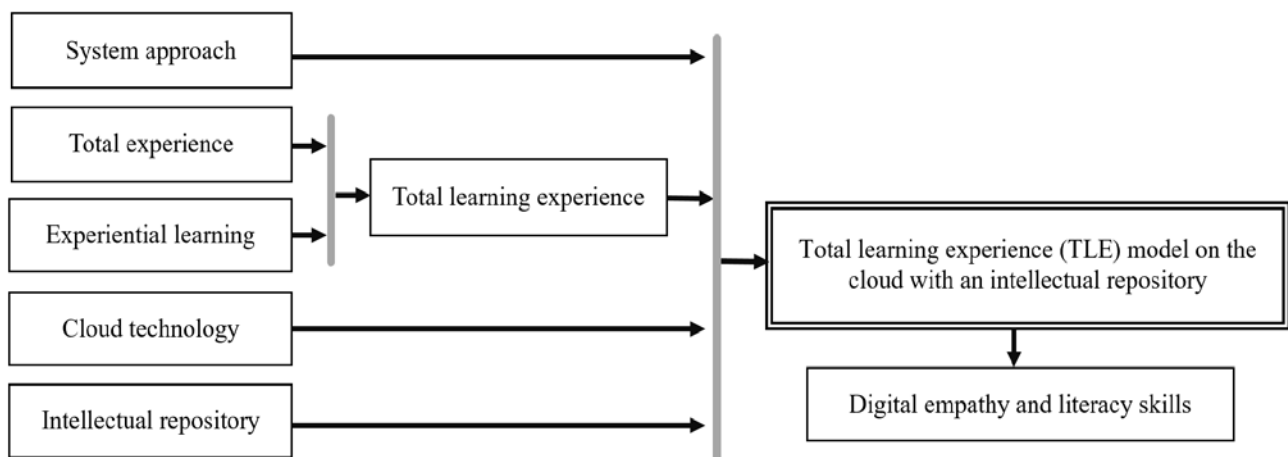

Figure 2: Conceptual framework.

Stage 2: Development of the TLE model.

This stage focused on the design of the structure and elements of the TLE model based on a system approach [9][10], which includes the principles of instructional design, learning process and systematic development. The major elements of this model include input, process, output and feedback. The development was based on the system development life cycle (SDLC) [11], and the total learning experience consisting of total experience [3] and experiential learning fundamentals [4]. The outcome of this stage was the prototype of the TLE model that could be used as a guideline to further develop the total learning experience management system on the cloud with an intellectual repository.

Stage 3: Development of the TLE process.

After completing the design and development of the TLE model in stage 2, this stage emphasised the design and development of the TLE process. This stage was accomplished by integrating the theories of the total learning experience [3][4] with the self-directed learning process of Knowles involving four steps [12]. As with the TLE model, the outcome of this stage was the prototype of the TLE process to be used as a guideline for further development.

Stage 4: Evaluation of the suitability of the TLE model.

The focal point of this stage was the assessment of the model's suitability, which was carried out by 20 academic experts from different institutions, derived by means of purposive sampling. All of these experts specialise in the design and development of instructional systems and Web applications, each has at least five years of work experience.

The criteria for data analysis were mainly based on the interpretation of Kanasutra's ratings [13], and are detailed in Table 1.

Table 1: Average score range and interpretation of results.

Average score range	Interpretation of results
4.50 - 5.00	Very high level of suitability
3.50 - 4.49	High level of suitability
2.50 - 3.49	Moderate level of suitability
1.50 - 2.49	Low level of suitability
1.00 - 1.49	Very low level of suitability

THE TOTAL LEARNING EXPERIENCE (TLE) MODEL ON THE CLOUD WITH AN INTELLECTUAL REPOSITORY

The main idea of this research was to design and develop the TLE model compliant with the instructional system, consisting of systematic elements, processes and steps (system approach). It was envisaged that the model would combine the system development life cycle (SDLC) with the concepts of new experience-based instructional technologies and platforms. As a result, new concepts of appropriate instructional design would be generated and utilised in the new regular instruction management with the focus on continuous learning. The ultimate goal was to empower learners, so that they could learn anywhere and anytime, with the aid of technology, leading to a learning society, digital empathy and literacy skills development. The concept of the TLE model including steps is illustrated in Figure 3.
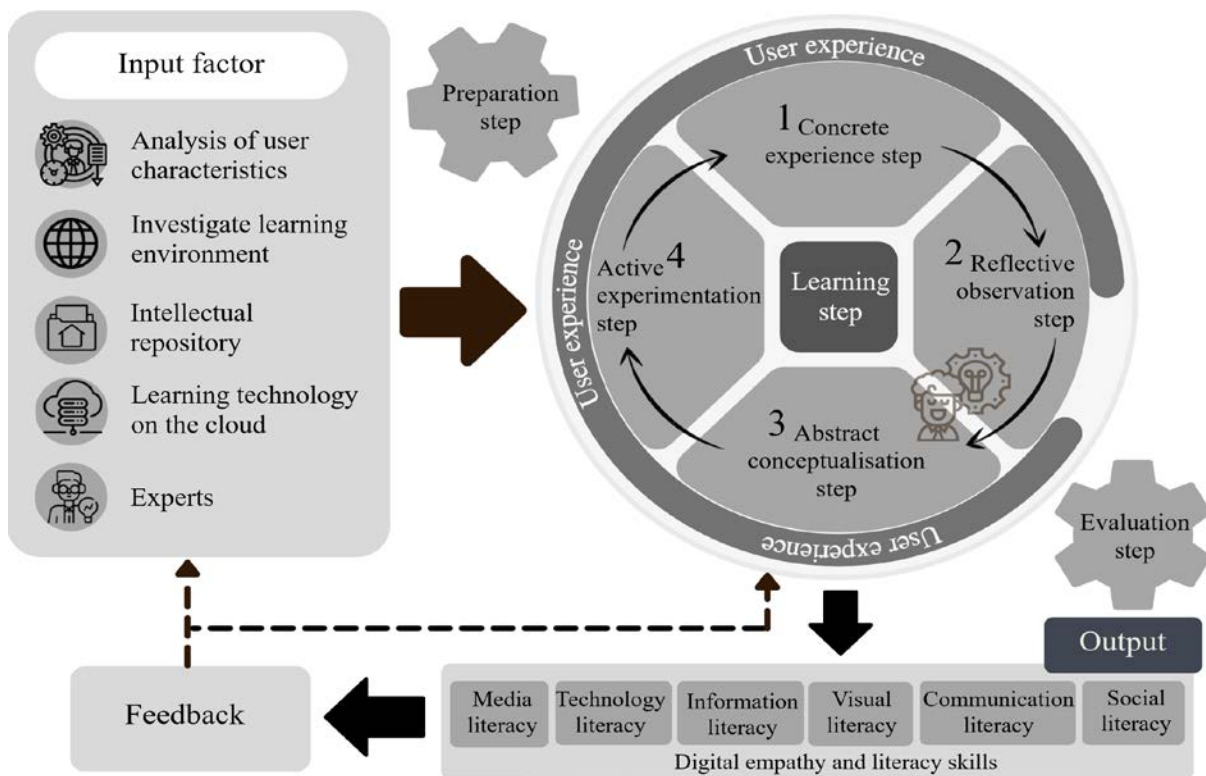

Figure 3: The concept of the TLE model with steps.

The four major elements of the TLE model presented in Figure 3 can be detailed as follows:

The input factor refers to the relevant factors from which the data were accumulated and utilised in the design and the development of the TLE model. These factors include an analysis of user characteristics, investigation of learning environments, an intellectual repository, learning technology on the cloud and experts.

The learning process refers to the process of learning within the TLE model. In this part, the researchers designed the learning process by integrating the theories of the total learning experience and the self-directed learning process. As a result, the learning process derived herein consists of three steps, i.e. preparation before learning, total learning experience on the cloud combined with self-directed learning and evaluation.

The output refers to the results of the learning process, i.e. digital empathy and literacy skills, which are essential to the understanding and the use of digital technology in an ethical manner, which includes recognition of other users' rights and compliance with the rules of Internet etiquette. More specifically, these skills include: media literacy, technology literacy, information literacy, visual literacy, communication literacy and social literacy, and demonstrated in Table 2.

Table 2: Abilities acquired in the learning process.

Ability		Digital empathy and literacy skills	Required characteristics - abilities acquired in the learning process
Digital literacy	1. Access	1. Media literacy	Ability to access digital media with understanding and communicate ideas in an efficient manner.
	2. Use	2. Technology literacy	Proficiency to use learning technology and communication technology.
		3. Information literacy	Ability to search for information, select appropriate information and use that information for data retrieval.
	3. Understand 4. Create	4. Visual literacy	Ability to understand and interpret what is seen, including analysis, learning and expressing opinions.
Digital empathy	1. Communication	5. Communication literacy	Ability to exchange knowledge and learn with others in society.
	2. Community	6. Social literacy	Ability to work together to achieve mutual goals.

The feedback refers to the use of data from the output stage to improve the learning process and input factors. Thereby, the feedback consists of the measurement result of digital empathy and literacy skills, and the experts' opinions.

THE TOTAL LEARNING EXPERIENCE (TLE) PROCESS ON THE CLOUD WITH AN INTELLECTUAL REPOSITORY

The learning process was developed based on the same foundations as the TLE model.

The TLE process was envisaged to promote limitless self-learning by means of active learning and encourage learners to have real experiences and face challenges. The concept of the TLE process including steps is shown in Figure 4.
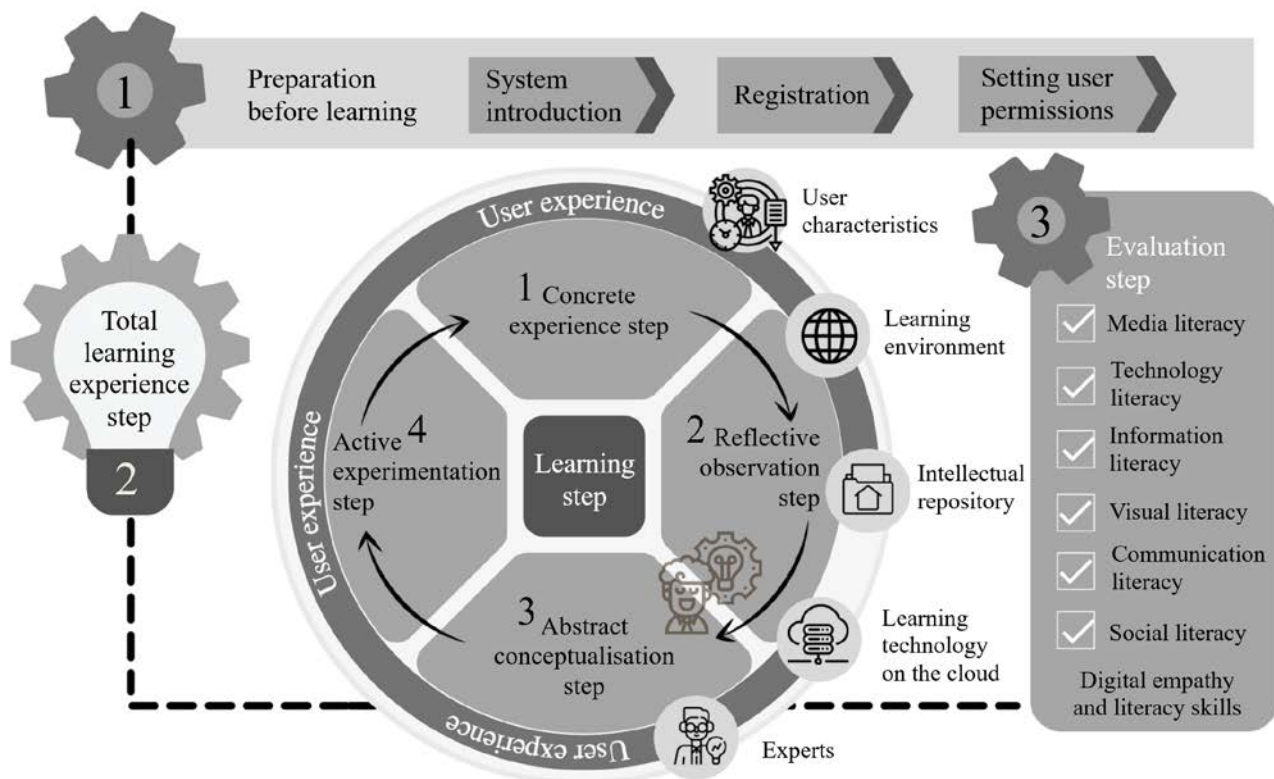

Figure 4: The TLE process with steps.

Figure 4 illustrates the total learning experience process on cloud using intellectual repository, which includes the following three main steps:

1) preparation before learning with three sub-steps, i.e. system introduction, registration and setting user permissions;

2) total learning experience on the cloud combined with self-directed learning, in which the researchers integrated the self-directed learning process with the theories of total experience and experiential learning as all of these can promote self-learning by means of active learning; whereby, there are four sub-steps in this part, i.e. concrete experience step, reflective observation step, abstract conceptualisation step and active experimentation step. Also, the researchers conducted contextual analysis to determine the elements supporting the Web-based self-directed learning, consisting of user characteristics, learning environment, digital repository, cloud learning technology and experts;

3) Evaluation step, which refers to the assessment after learning by means of the developed learning process. The expected results derived from the learning process are digital empathy and literacy skills.

Table 3: Activity plan based on the TLE learning environment to enhance digital empathy and literacy skills.

Learning process	Role of user	Characteristics for measurement	Digital empathy and literacy skills
1. Concrete experience	Users are open to new experiences or new situations in order to activate real learning.	- Ability to access the learning environment with understanding and communicate ideas in an efficient manner. - Proficiency to use learning technology and communication technology. - Ability to search for information, select appropriate information and use that information for data retrieval.	- Media literacy - Technology literacy - Information literacy
2. Reflective observation of the new experience	Users reflect on their ideas by asking questions, which generates new ideas from their own learning experiences.	- Ability to understand and interpret what is seen, including analysis, reflection and expressing opinions.	- Visual literacy
3. Abstract conceptualisation	Users create new knowledge.		
4. Active experimentation	Users experiment with the new knowledge to see whether it meets their goals or not.	- Ability to exchange knowledge and learn with others in society. - Ability to work together to achieve mutual goals.	- Communication literacy - Social literacy

EVALUATION RESULTS

The evaluation results of the suitability of the TLE model can be split into two parts:1) suitability of the TLE model, and 2) suitability of the TLE process. The details of the evaluation are shown in Table 4 to Table 7.

Table 4: Evaluation results of the suitability of the TLE model - items (overall elements).

Items	Results		Interpretation
	Mean	SD	
1. The TLE model includes principles and concepts that can be used to develop instructional systems.	4.90	0.31	Very high
2. The elements of the TLE model cover the main elements needed for instructional systems.	4.85	0.37	Very high
3. The TLE model is based on appropriate and comprehensive theories that can be used in the design of the conceptual framework.	4.90	0.31	Very high
4. The order of elements in the design of the TLE model is clear and consistent relative to each other.	4.80	0.41	Very high
5. The order of elements in the TLE model is appropriate and easy to understand.	4.85	0.37	Very high
6. The elements of the TLE model are complete, comprehensive and compliant with the objectives of this research.	4.80	0.41	Very high
Overall	4.85	0.36	Very high

According to Table 4, it was found that the overall suitability of the developed TLE model (overall elements) is at a very high level (mean = 4.85, SD = 0.36). Thus, it can be concluded that the TLE model contains all complete elements that can be used as a guideline for the development of the TLE management system, which encourages experiential learning and generates new knowledge through self-learning with the aid of digital technology.

Table 5: Evaluation results of the suitability of the TLE model - steps.

Steps	Results		Interpretation
	Mean	SD	
1. Input factor	4.90	0.30	Very high
2. Learning process	4.89	0.31	Very high
3. Output	4.80	0.41	Very high
4. Feedback	4.83	0.38	Very high
Overall	4.87	0.34	Very high

Referring to Table 5, it was found that the suitability of the developed TLE model is at a very high level (mean = 4.87, SD = 0.34). Hence, the TLE model can be further adopted for the development of the TLE management system.

Table 6: Evaluation results of the suitability of the TLE process - items.

Items		Results		Interpretation
		Mean	SD	
1. Preparation before learning.		4.87	0.34	Very high
2. Total learning experience on the cloud combined with self-directed learning.	2.1. Experiential learning theories.	4.89	0.32	Very high
	2.2. Self-directed learning process.	4.84	0.37	Very high
3. Evaluation.		4.90	0.30	Very high
Overall		4.88	0.33	Very high

Table 6 shows that the suitability of the developed TLE process is at a very high level (mean = 4.88, SD = 0.33). Hence, it can be stated the TLE process can facilitate self-learning experiences and encourage learners to develop digital empathy and literacy skills. This finding is compliant with the research of Canese et al, who pointed out that the application of technologies in education can improve the teaching and learning process, as well as help to develop ICT competence, which is considered indispensable for lifelong learning [14].

Table 7: Evaluation results of the suitability of the TLE model in terms of implementation.

Items	Results		Interpretation
	Mean	SD	
1. Suitability of the TLE model in regard to the promotion of digital literacy skills.	4.90	0.31	Very high
2. Suitability of the TLE model in regard to the promotion of future learning organisations.	4.85	0.37	Very high
3. Suitability of the learning steps and learning process in regard to the promotion of digital empathy and literacy skills.	4.75	0.44	Very high
4. Possibility to apply the TLE process to enhance digital empathy and literacy skills in the development of the total learning experience management system.	4.85	0.37	Very high
5. Possibility to apply the TLE model as a guideline to develop the total learning experience management system.	4.85	0.37	Very high
6. Possibility to apply the TLE model in practical use.	4.85	0.37	Very high
Overall	4.84	0.37	Very high

As demonstrated in Table 7, it was found that the suitability of the TLE model in terms of implementation is at a very high level (mean = 4.84, SD = 0.37). Hence, it can stated the TLE model includes the appropriate elements, learning steps and the learning process, and as such it can be used as a guideline to develop the total learning experience management system.

CONCLUSIONS

The total learning experience model on the cloud with an intellectual repository is considered a tool that can be employed to facilitate limitless self-learning by means of active learning, which encourages learners to have real experiences and face challenges, leading to the creation of new knowledge that can also be applied in other contexts. To develop the TLE model, the researchers have employed the learning platforms consistent with the new regular learning, combined with learning through digital technology, which is appropriate for new generation learners, because it facilitates direct learning experiences, leading to the future of learning. The TLE model consists of main elements:

1) Input factor, including analysis of user characteristics, investigation of learning environments, intellectual repository, learning technology on the cloud and experts.
2) Learning process, consisting of three steps, i.e. preparation before learning, total learning experience on the cloud combined with self-directed learning and evaluation.
3) Output or digital empathy and literacy skills, which are composed of media literacy, technology literacy, information literacy, visual literacy, communication literacy and social literacy.

The TLE process was developed by integrating the theories of the total learning experience and the self-directed learning process. As a result, the TLE process consists of three steps:

1) Preparation before learning.
2) Total learning experience on the cloud combined with self-directed learning, in which the principles and theories of total experience, experiential learning and self-directed learning process are integrated together.
3) Evaluation, in which the results gained from the learning process are digital empathy and literacy skills.

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