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INSTRUCTIONAL DESIGN OF E-LEARNING: OVERVIEW OF THE CURRENT LITERATURE

The covid-19 pandemic has changed the notion of education completely. All kind of educational institutions had to switch to distance learning urgently. Such immediate transmission to new educational format requires suitable approaches and methods to meet the students' needs. Therefore, numbers of researchers started studying this issue to design an effective Instructional design for e-learning. The current article is aimed to analyze existing researches in the field of Instructional Design to determine the most common approach to e-learning. To fulfill the goal various theories and model before and during quarantine were collected and reviewed. The study has shown that major part of authors assume that e-learning requires an instant and timely feedback to students. Moreover, it was derived that one of the necessary change differing from traditional face-to-face sessions is breaking down the topic and material into smaller pieces. That will help student to perceive information more effectively. Some of the researchers suggest the idea that students must have a chance to study at their own pace, which will increase the understanding.

Key words: COVID-19, Instructional design, pandemic, e-learning, distance learning, remote learning, online education.

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**Қашықтықтан оқытудың нұсқаулық дизайны:
заманауи әдебиетке шолу**

Ковид-19 пандемиясы адамдық білім туралы ойларын толығынан шығарды. Соңғы оқу жылында барлық оқу орындары қашықтықтан оқытуға көшуге мәжбүр болды. Университеттердегі білім беру бағдарламалары күтпеген жағдайларға қарамастан студенттердің қажеттіліктерін қанағаттандыру үшін тиімді оқу-әдістемелік бағдарламаларын қажет етеді. Жаңа білімге тез арада көшу шин оқушылярық қажеттіліктеріне сүйене келетін түсініктер мен адистер қажет. Сондықтан кейбір зерттеушілер бұл мселені олайн оқытудың тиімді оқу бағдарламасын құру мақсатында зерттей бастайды. Бұл мақала электронды оқитудың жаңа таралған түсінігі, оқуы-әдістемелік жоғарыдағы салауаттағы зерттеулерді талдауға бағытталған. Мақсатқа жету ұшын әртүрлі теориялар мен моделдер карантині туралы карантин кездерінде таланды. Тағы да бұл мақалада нұсқаулық дизайнын анықтау тәсілдері қарастырылған. Біздің талдауымыз бойынша зертеу барысында авторлардың көпшілікті электронды оқуы студенттерден жедел және ұқтылы кери байланысты талап етеди деп санады. Сонымен қатар, сабақтардан басқа қажетті өзгерістердің бірі тақырып пен материалды кішірек бөліктерге бөлу екендігі анықталды. Мұндай бөлу студенттік ақпаратты тимди кабылдауға көмектеседи. Кейбір зерттеушілер студенттерге үз қарғанда білім алу қажет, бұл түсінуді жақсартады деп ойлайды.

Түйін сөздер: COVID-19, оқыту дизайны, пандемия, электронды оқыту, қашықтан оқу, онлайн білім беру.

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**Учебный дизайн дистанционного обучения:
обзор современной литературы**

Пандемия COVID-19 полностью изменила представление об образовании. За последний год все учебные заведения были вынуждены срочно перейти на дистанционное обучение. Такой незамедлительный переход на новый образовательный формат требует соответствующих подходов и методов, отвечающих потребностям студентов. В связи с этим ряд исследователей

начали изучать этот вопрос, чтобы разработать эффективный учебный план для дистанционного обучения. Настоящая статья направлена на анализ уже существующих исследований в области учебного дизайна, чтобы определить наиболее распространенный подход к электронному обучению. Для достижения цели были собраны и проанализированы различные теории и модели до и во время карантина. Исследования показали, что большинство авторов полагают, что онлайн-обучение требует мгновенной и своевременной обратной связи со студентами. Более того, было установлено, что одним из необходимых изменений, отличающихся от традиционных занятий, является разбивка темы и материала на более мелкие части. Это поможет студенту наиболее эффективно воспринимать информацию. Некоторые исследователи предполагают, что студенты должны иметь возможность учиться в своем собственном темпе, что улучшит понимание.

Ключевые слова: COVID-19, учебный дизайн, пандемия, электронное обучение, дистанционное обучение, удаленное обучение, онлайн-образование.

Introduction

Currently, there are four main forms of education in the system of higher education of the Republic of Kazakhstan: full-time, evening, correspondence and distance learning. Distance education is implemented using three technologies (or their combination). In the first case, we are talking about the creation of certain cases, which, virtually or in reality, should be handed over to students for study. These can be CDs with audio recordings or handouts in electronic (less often paper) media, which enable listeners to understand the main essence of the issue being studied, in order to subsequently continue working with the help of virtual libraries. Intermediate certifications in this case are in the form of submission of abstracts (in electronic or paper form) and online exams using special programs (Malceva, 2012). E-learning has become quite widespread over the last 20 years (Debattista, 2020). Sapargaliyev (2012) in his study called E-Learning in Kazakhstan: Stages of Formation and Prospects for Development predicted that online learning would become one of the main forms of education during the next ten years. There are numbers of reasons which facilitated the popularity of online instructions, such as, globalization and digitalization. However, large-scale switch to the e-learning adaptation occurred in 2020 due to the world pandemic and compulsion to be isolated (Aguilera-Hermida, 2020). Such urgent transition to remote learning format may lead to certain obstacles such as, decreasing quality of education and unpreparedness of educational system to harsh changes (D'Orville, 2020). Therefore, the educational programs at Universities require effective instructional design programs to meet students need despite unexpected circumstances. The main purpose of the paper is to find out a suitable instructional design in order to enhance effectiveness of learning process. To fulfill the aim certain objectives are set up. First of all, this article discusses ways to define Instructional Design. Then it demonstrates its theories and models and ways of their application for e-learning based on previous researches. Finally, there is a comparative analysis of the ID of e-learning before COVID-19 pandemic and during the quarantine period. This paper consists of the following parts: introduction; literature review, methodology, findings and discussion, limitations, conclusion, and further implementation.

Definition and models of the Instructional design

The Instructional design notion can be defined as a process of course planning and its professional application (Branch & Merrill, 2011). The term was first introduced in the middle of the 20th century in the US. Schott & Seel (2015) suggests various interpretations of Instructional Design (ID). For instance, in narrow sense ID is the planning of a certain instructional approach, while broadly besides planning it also concerns the construction of educational setting and outcomes. However, the common interpretation of the notion refers to the process of education including instructions, classes, curriculum etc. Moreover, the ID can be elucidated from perspectives of three levels, such as: macro-level which refers to the bigger periods of time from several month to years. It covers the whole programs, curricular or systems. While at meso-level the period of time of ID varies from weeks to hours. The micro – level concerns smaller part of lesson plans, such as, certain class activities or presenting materials. It is noted that meso – level is used more frequently, although the levels limits are still not identified clearly (Schott & Seel, 2015). Jiwak (2019) suggests that Instructional Design are certain rules that make up the sequence of process and includes certain methods, namely, analysis, design, development, application and assessment. Shortly, Instructional

Design is aimed to fulfill particular educational program objectives.

Besides, Jiwak (2019) claims that ID models can vary depending on program purposes and needs. For instance, ID model for regular classes may differ from online courses, job training or educational workshops. Smith and Ragan (2005) define models as visual description of ID process indicating key components and their correlation. The purpose of ID models to guide the procedure of organization and structuring of certain instructional activities.

The ID models can be classified into three following categories: system-oriented, product-oriented and classroom-oriented (Gustafson & Branch 2002). System-oriented model is considered to be high level model. This type of modal is focused on the aim of the course before developing the instruction. Whereas, the product-oriented model is focused on instructional product development in terms of self- learning or online learning.

Classroom oriented models are focused on enhancing teaching and learning process and include such kid of models as Kemp and ASSURE. ASSURE ID model, which is oriented on development of technology-integrated instructions, was worked out in 1996. The authors of the model Heinich, Molenda, Russel, and Smaldino. The acronym can be explained by six stages which imply: analyse students (this means, that instructors are supposed to know their students abilities and characteristics); state standards and objectives (the outcomes of the learning process must be determined before the learning process); select strategies, technology, media and materials (including different teaching and learning strategies, implementing some technology and approaches during the learning process); utilise technology, media and materials (implementation of electronic devices, media sources in the learning process to provide technology integrated ID); require students participation (learners engagement in the learning procedure), evaluate and revise (the assessment of learners achievements and lesson plans) (Heinich et al., 1996).

Turning to the following model related to classroom-oriented category, Kemp's Instructional Design model is structured in non-linear way and considered to be innovative. The model consists of nine stages. The first stage concerns certain instructional problems. At this phase a tutor sets up goals and determines related issues. The second phase is aimed to identify learner's abilities. The next is called task analysis and deals with potential content. Tutors at this stage examine the correspondence of content to the course aim. The fourth phase

concerns the instructional objectives, when the course objectives are identified and specified. The fifth stage is sequence of content, where elements of instructions are organized logically in a specific order. The next step is about instructional strategies. It is aimed to fulfill the set up objectives. After that message design comes. At this particular stage tutors deal with planning and developing instructions. The eights stage is the instruction development. Certain learning activities are selected at this phase. At the final stage tutors have to assess hoe the objectives are completed by the end of the course (Morrison, Ross, Kemp, & Kalman, 2010).

The apparent difference between ASSURE and Kemp's models is that stages of the last are not correlated with each other, therefore it is possible to start from any of the given nine phases. Thus, the main advantage of the Kemp's is that it provides flexibility.

Another similar model, called ADDIE, was suggested in the Florida State University in 1975. The model stands for Analyze, Design, Develop, Implement and Evaluate. Such model allows instructional designers to organize learning process in clear stages, thus tutors will meet certain learner's needs, obtain learning objectives and achieve expected outcomes (Pappas, 2017).

Instructional design theories

Reigeluth (n.d.) believes that ID theory is a tool that suggests assistance for learning and development. He suggests certain characteristics that are peculiar to ID theories. For instance, the author assumes that instructional – design theories are design- oriented, which means that it focuses on the special tools and ways to achieve learning aims. Moreover, ID theories describe particular methods of instruction and cases of their usage. Finally, it is possible to divide those methods into smaller detailed elements.

As an example, he describes Perkins's (1992) instructional design theory 'Theory One'. It claims that in order to activate cognitive thinking in learning, following aspects must be followed. First of all, the tutor must provide clear information and explain expected outcomes, goals and content. Besides, Perkins' states that learners must participate actively in the learning process and reflect the received input. Moreover, the instant feedback is required. If tutor gives certain comments on learners' achievement, that may help them perform more effectively. Finally, according to the Theory One, learners must be motivated by both internal and external factors.

Thus, the essential goal of the theory is to improve learning process, so it is beneficial for tutors as they have assistance for teaching and instructing.

Besides Perkin's ID theory, there are other theories introduced earlier. For instance, Situated Cognition theory came to the existence in 1989. The theory, which was introduced by Brown, Collins, and Duguid, presents the idea that learning must always occur within a certain context, because it is impossible to separate knowledge and actions. That is why learners are supposed to obtain the skills and knowledge followed by immediate practice. Obviously, any information given in class is presented within a context. Therefore, Instruction designers have to come up with various case studies or interactive scenarios based on real life, where students are expected to apply obtained knowledge (Brown, Collins and Duguid, 1989).

Another well-known instructional design theory was suggested by Lev Vygotsky in the beginning of the 1930s (Vygotsky, 1994). The theory is called Sociocultural Learning Theory and includes three key components, namely, language, culture and zone of proximal development. They essential idea of the theory is the importance of environment in learning process. According to Vygotsky, culture, which is one of the components of the theory, is the main sign of distinction between humans and animals. Therefore, taking into account cultural peculiarities while designing a course or lesson can increase efficiency of learning process. Another aspect of the theory is language, which is dependent on the cultural peculiarities. Vygotsky suggests three phases of development of speech. Firstly, children are involved in so-called "social speech", occurring at the age of 2. The second phase begins when learners are 3 and when they can announce their personal thoughts. Finally, "inner speech" stage begins. At this stage language impacts the behavior and thoughts. Usually it starts at the age of 7 (Kozulin et al, 2003).

Thus, while implementing Sociocultural Learning ID Theory, instructors have to take into account environmental aspects and role of peers while designing learning activities.

Turning to another theory, which is called Individualized Instruction Theory, it suggests that the course curricular is supposed to allow students to learn at their own pace. Instructors are required to differentiate instructions and activities for different levels. The theory emerged in the middle of 1960s and was developed by number of authors, such as, Fred Keller (1968) . Another similar theory was presented by Merill. His theory

as well as Individualized Instruction is focused on the facilitation of learning process. There are four chronological stages, namely, demonstration, elicitation of prior knowledge, implementation and relating to the real life context (Merill, 2002).

Jerome Bruner describes another theory which was basically a method of Inquiry-based Instruction. The Discovery learning theory focuses on the idea of searching of new facts, correlations and using past experience with creativity. There are five basic principles in the theory. The first principle for instructors is called Problem Solving Principle. It claims that they must provide guidance to search for solutions using background knowledge and new information. The second principle is Learner Management. In this case, teachers must take into account students' preferences to work alone or in teams, so the learning process is much more flexible for those who have different pace while learning. According to the third principles learners must be able to connect learning material to the real life situations. Therefore the course should combine familiar scenarios and life based situations. The next principle proposes the idea that learners must be able analyze and interpret the obtained knowledge, rather than memorize it. Finally, learners must get instant feedback as the are involved in discovering new knowledge (Discovery Learning, 2011).

Methods

The current research paper is aimed to find out effective Instructional Design models for online learning. We have compared various studies within the last decade. To complete the analysis we have examined N researchers following certain principles: year, ID theory, model/approach, Instructors role and assessment ways. The main focus of the paper is to compare the approaches to online education before and during the Covid-19 pandemic.

Results and Discussions

After reviewing several articles suggesting various approaches to the distance learning during the quarantine time we have compared the findings and presented in form of the table (table 1. Comparative analysis of e-learning ID models)

The history of online learning goes past to the beginning of the 21st century. Therefore, by 2002 the term of "e-learning" was quite recognized and perceived as a new tendency, although different institutions could not still clearly define the concept (Young, 2002).

Table 1 – Comparative analysis of e-learning ID models

Author (s)	Theory	Model/approach	Learning design	Instructors' role	assessment
Scalise & R. (2012, p. 1)	Sociocultural Learning Theory	reciprocal leadership approaches	Structured reciprocal leading model Semi-structured reciprocal model Cascading reciprocal model	Assign leaders and groups, monitor and assess	observation
Chen (2016)	Situated Cognition theory	ICCEE	Identify, Choose, Create, Engage, Evaluate	Designer, facilitator	holistic and formative
Dabattista (2018)	Situated Cognition theory	Comprehensive rubric	10 interrelated aspects of rubric	Clear guidance, facilitator, observer	Goal achievement grading, feedback
Rapanta et al. (2020)	Situated Cognition theory and Individualized Instruction Theory	pedagogical content knowledge	combination of the context, tools and resources, concrete tasks and relations between three components	Cognitive, social, facilitator	Self-reflections, portfolios, Feedback
Soni (2020) Mahmood (2020)	Individualized Instruction Theory	Instructional strategies	Dividing the content into smaller modules, diverse discussion	Educator, facilitator, mentor	Timely feedback

There have been some changes in Instructional design then, as instructors have become learners as well as their students. Thus, teacher-centered approach shifted to student-centered learning.

There are numbers of literature on the topic of e-learning which suggest various approaches to new educational conditions and their difficulties.

One of the approaches to e-learning was suggested by Scalise & R (2012, p. 1). They claim that one of the harshest obstacle in online and combine learning is effective group interaction, as it would differ from traditional classroom approach. Thus, the authors suggest three reciprocal leadership approaches. The concept of reciprocal leadership (or teaching) was originally used for reading comprehension, when one group member had a role of instructor in small reading groups (Palincsar & Brown, 1985). However nowadays the method has broaden its usage towards other learning activities. The authors describe three reciprocal leading models of ID.

Another model of ID was described by Chen (2016) presents five principles ICCEE. It stands for identify, choose, create, engage and evaluate. The author claims that the given model can guide tutors while designing an Instructional Design for online learning in a very effective way. Besides using the model students will be engaged and well motivated. Another peculiarity of ICCEE model is that it can be either linear or circular. Which means in online environment it is possible to return to any phase of the learning procedure.

The first traditional model was basically implemented for reading classes. The instructors assign groups and their leaders to facilitate the reading discussion. Leaders are supposed to post a comprehensive summary of a certain piece of text. Then, other group members are expected to respond and give comments on the reading. Leaders may ask content checking questions and continue discussion. The role of instructors here is to monitor the whole process without interfering.

Another model designed for e-learning is semi-structured reciprocal leadership. The aim of the model to elicit certain analyzing and critical skills, as students have to write a critique or review for given research papers. They are supposed to share their opinion with the rest of the group and after that students are involved in discussion threads where they are free to comment each other's critiques. The paper provides some detailed examples of such kind of activity. The authors believe that using these model during online classes will help to improve their writing and collaborative skills. Moreover, the activity does not require to follow strict frameworks, so participants are free to choose the format of the critique. Some students may write their recommendations for further improvement while others can give comments on structure and grammar.

The final model, which is called "cascading", is considered to be the lest structured model for distant learning, as here learners are not limited by certain frameworks. Instructors set a certain goal, for in-

stance, to find out how a particular software works. Students share their ideas and come to certain solution. The idea of the model is that those students who completed the task first are supposed to become reciprocal leaders of the rest of the group. The model corresponds to individualized learning theory as learners are free to seek for solution at their own pace (Scalise and Ketterlin-Geller,2014).

Debattista (2018), in his Comprehensive Rubric For Instructional Design In E-Learning demonstrates one comprehensive rubric based analysis of four different rubrics worked out in different institutions. The rubric includes ten following aspects:

1) the instructional design, which covers program structure, aims, objectives, outcomes, methods and approaches;

2) Course beginning when instructors provide clear information on online learning course, brief description of the e-learning course, some aspects of class behavior, technical competences, which include certain aspects of technical equipment for successful course;

3) E-assessment, which includes achievement of goals, grading, instant feedback and management, so learners can observe their grades and feedback at any time;

4) Community relations include teacher – student interactions and peer learning;

5) Instructional resources, when tutors have to effectively select compulsory and secondary learning material;

6) Learning support when students have technical, instructional, academic and administrative support;

7) design of technology, when technology meet learning objectives and outcomes;

8) Evaluation of the course. Students are given an opportunity to reflect on the course advantages and weaknesses, to improve instructional design;

9) Ending of the course. Teachers have to provide clear assessment and make sure that all issues have been resolved;

10) Instructional design cycle. At this stage, tutors and organization conducts review of the technological, administrative and academic aspects. That will help to improve e-learning process.

However, online learning has become the core format of getting education within the last year, due to the Covid-19 World pandemic (World Health Organization, n.d.),.

Thus university instructors had to switch from familiar traditional face-to-face instructions to the online atmosphere (Rapanta et al., 2020). The research paper concerns readiness of university staff, particularly teachers who have no experience in e-learning, for new instructional design. Besides lack of experience, some of the difficulties are conditioned by poor technical equipment and mainly by changing program curriculum to fit online format. Rapanta et al., in their study have worked out a new instructional design for e-learning based on the interview with four experts in online education. The questions were formed to find out difference between online ID and face-to-face teaching; some tips for non-experts to improve online teaching; some crucial tools for teachers while instructing online and certain assessment ways. The results have shown that all the experts expressed the opinion that teaching activity must focus on a certain goal and highlighted necessary learning activities, such as, the students' objectives, resources and instruments, certain class activities and the ways to combine all three activities to work together. Instructors have three main responsibilities, namely, cognitive presence when teachers have to assess learners preparedness for learning process; social presence, to be ready for interaction with students and the role of facilitator to guide learner throughout the online learning process. As the situation with the Covid – 19 is unaccustomed for many students, teachers have take into account the period of time students have to take in order to regulate themselves, therefore the authors suggest account learners individual pace .

Soni (2020) in his research paper Global Impact of E-learning during COVID 19 suggest certain tips to design an online course and involve students. He believes that educators of different levels could drop their course into smaller pieces to provide comprehensive material and take into account learners individual pace and reaction. Furthermore, he claims that teaches must think about convenient platforms, such as, Google Classroom, Zoom, messengers and etc., and control the speed of their speech to make sure that learners comprehend given information in a right way. Finally, the author focuses on the importance of detailed and timely feedback to increase learners motivation and involvement into the learning procedure.

The similar idea of ID model for e –learning was suggested by Pakistani researcher Samreen Mahmood (2020) in his research paper called Instructional Strategies for Online Teaching in COVID-19 Pandemic. The article consists of several instructional strategies for effective online learning classes in higher educational institutions. Although the article does not suggest certain model, it still has a set of tips for tutors to enhance

the e-learning process. He claims that course must be divided into smaller parts, as he believes that will help keep student involved and develop their online learning abilities. Besides, he highlights the role of instant feedback and creative thinking. In addition, the author promotes the idea of involving of telecommunication into the learning process to decrease internet problems during online courses.

Limitations

The current paper contains analysis of various approaches in field of e-learning. Even though authors give clear examples of suggested Instructional design the reliability is still limited by the fact that such urgent switch to the online education has still instructional gaps and requires improvement as the results of online education are not clearly seen at current stage. Moreover the authors of the analyzed article refer to different countries, therefore some of the aspects cannot be applicable for certain cultures. In addition, there is still dependence on the technical issues, that may prevent successful distant learning. The final limitation of the current paper is the lack of Kazakhstani studies in the field of Instructional design during the quarantine time, so the comparative analysis is based only on foreign studies.

Conclusion

After analyzing the different studies in the field of online learning and its ID models and approaches, the noticeable difference between online learning ID before the pandemic and during this time is that there is an obvious common idea about giving students to learn at their own pace and provide instant feedback. Another peculiarity is that all the approaches are focused on context learning. Besides, tutors have to take into account learners' individual peculiarities and drop the teaching material for more comprehensive input. Moreover, Instructors may assign certain leaders and groups to improve collaborative skills and facilitate assessment.

Considering the table 1 and the literature we came to the conclusion that one of the effective way of designing an effective e-learning program is to focus on students' individual peculiarities and pace of learning. Moreover, the larger topics and units might be divided into smaller parts to make sure that students absorbed the input. Finally, the ID model should consider the assessment in the way of feedback of both instructors and students to guide and lead the learning process.

As the compulsory e-education has been applying for the first year the effective ID model is still debatable. It requires broader studies and collecting more empirical date. Thus, the results of the e-learning can be only predicted.

Further implementation

This paper may be used as a guidance for educators who has a little expertise in online teaching, as it provides some tips and describes general models of ID for e-learning based on previous studies and experience of other countries. Moreover, this overview of the literature will be used for further empirical examination of ID models and developing new ID approach for e-learning.

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