Material Designing: Peculiarities and Models

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Abstract: The article deals with the issues based on material designing as an effective tool for creating educational materials, including in the field of e-learning. The very concept of material design is analyzed in the historical aspect, its models and principles are presented. Designing materials allows instructors to investigate and acquire new information, which takes the form of assignments. Material design, in the framework of preparing students for corporate work life, not only exposes students to diverse learning circumstances, but also assists teachers in developing their professional abilities.

Keywords: educational materials, material designing, models, ADDIE, learning process.

INTRODUCTION

Material designing is the practice of systematically developing and designing, teaching products and experiences, both digital and physical, in a consistent and reliable way to ensure effectiveness, efficiency, appeal, engagement, and inspiration. knowledge. The process is basically defining the purpose of the state and increasing the definition of learning and creating an "intervention" to help with the transition. The result of this instruction may be directly observable and measured, or hidden and inferred. There are many training models, but many of them are based on the ADDIE model, which consists of five stages: analysis, design, development, implementation, and evaluation.

The design of teaching materials requires taking a set of decisions, making choices and explaining the reasons for them. This practice will grant them some autonomy (in terms of taking responsibility for decision-making), and also create opportunities (and the necessity) for reflection.

MATERIALS AND ANALYSIS

According to Ehiyazaryan (2012), McAndrew (2009), there is a greater opportunity for students to get knowledge from diverse sources, and teachers openly exchange and reuse educational materials with students. In order to acquire the language skills required for target language acquisition, language teachers must provide relevant resources and give enough training. Language acquisition improves students' effectiveness in real-world circumstances, and teachers must expose pupils to such scenarios through learning materials.

The concept of material design emerged in the literature on technology for education in the late 1990s and early 2000s with the idea that "designers and educators should choose for themselves the best combination of behaviorist" and constructivist learning experiences for their online courses. "But The concept of material design is probably as old as the concept of learning. Material design can be defined as "the description of the teaching-learning process that occurs in a learning unit (for example, a course, lesson, or any other planned learning event)".

I. A. Takushevich notes that back in the 1970s, there were already more than 40 models of pedagogical design that were used in various areas of public life: business and industry, in the military sphere, a special journal

dedicated to the development and development of educational technologies "Journal of Instructional Development" began to be published [6].

R.M. Branch and D. Merrill [1] identified some characteristics that any model of instructional design should have. According to them, material designing:

✓ student-centered: the student and his/her activities are in the center;

✓ focused on a clearly defined goal;

✓ focuses on the activities of students in the real world: should help students complete tasks and follow the behaviors that will be expected of them in life;

✓ focuses on results that can be assessed using a reliable and accurate method of pedagogical measurement.

✓ has an empirical nature: reliable data is the central element of the educational process;

✓ usually team work.

DISCUSSIONS

According to I.A. Ageeva, the expediency of modeling the pedagogical process, taking into account the new possibilities of ICT, is due to: the request of society in the new political, economic and social conditions, the request of the individual with her need for constant self-expression and intellectual development, and the dynamism of social life [2]. Among the most common models, we can mention ADDIE (Analyze, Design, Develop, Implement, and Evaluate), SAM (Successive Approximation Model), SMART (Specific, Measurable, Attainable, Relevant, Time-bound), ALD (Agile Learning Design), Dick & Carey, Kemp, 3PD, ICARE (Introduction, Connect, Apply, Reflect and Extend), ASSURE (Analyze Learners, State Standards and Objectives, Select Strategies, Technology, Media, and Materials, Utilize Technology, Media, and Materials, Require Learner Participation, Evaluate and Revise) etc.

A typical material designing model is abbreviated as ADDIE and consists of 5 interdependent, constantly recurring phases:

1) Analysis - a preliminary analysis of the goal and objectives of training, finding out the level and profile of the trainees, thinking through the necessary steps to move towards the goal, etc.;

2) Design - setting the goal and objectives of training, choosing the format of the course and classes, creating a learning strategy;

3) Development - development of course materials, methods and methods of their presentation in the educational process;

4) Implementation - implementation of the developed course materials;

5) Evaluation - evaluation of learning outcomes, mainly, the level of proficiency in the subject of students. This stage is usually found at the end of the ADDIE model, but is relevant for all stages, since assessment should be conducted on an ongoing basis, which helps to review the entire educational process and make timely adjustments.

E.V. Abyzova, considering the process of creating effective teaching aids from the point of view of pedagogical design, notes that the development of effective teaching materials should be based on theories and principles of training and education, taking into account the age and psycho-physiological characteristics and preferences of students, in accordance with the logic of the learning process and with taking into account the features of memory, thinking and perception of information [1]. Unfortunately, not all developers of

educational materials and digital educational resources follow the basic pedagogical principles of organizing the educational process, thus it is especially important to focus on the principles of pedagogical design identified by K.G. Krechetnikov:

➢ scientific character, which implies the use of such techniques and methods of organizing educational material that will be theoretically substantiated and tested in practice;

➢ visibility: during training, the maximum number of channels for perceiving information should be involved;

➢ accessibility of science: in the learning process, the accessibility and use of scientific knowledge by students should be ensured, and the level of complexity should be in the zone of proximal development of students;

➢ visibility of thinking - aspects of the psychology of perception and learning should be taken into account as much as possible in the course of planning and implementing the educational process;

➢ continuity and succession, which involves ensuring the consistency of training courses, procedures, rules and means of their development;

➢ comfort: students should be provided with convenience and ergonomics of perception [3].

In order to have a concrete idea about the use of ICT in the educational process, to be able to choose the right resource for a specific situation and be able to use it correctly, it is important to constantly work on the level of development of their ICT competence. The ADDIE model was provided by the University of Florida to explain "The processes involved in formulating an instructional systems development (ISD) program for interservice training of military personnel that will adequately train individuals for a specific job, and" this can also be applied to any curriculum development between activity services." Initially, the model contained several steps in the five initial inputs (analysis, implementation, implementation, and [assessment and design] control), the completion of the phase was expected before moving on to the next stage of the stage. Over the years, the steps have been revised, and the model itself has become more dynamic and interactive than its original hierarchical representation, until its most popular version appeared in the mid-80s, as we understand it today.

Dick and Carey have made significant contributions to the field of material designing by advocating a systemic view of learning, as opposed to defining instruction as the sum of individual parts. The model views learning as a holistic system, focusing on the relationship between context, content, learning, and instruction. According to Dick and Carey, "Components such as the instructor, students, materials, learning activities, delivery system, and learning and performance environments interact with each other and work together to deliver desired student learning outcomes."

Another well-known instructional design model is Dick and Carey's systems approach model. The model was first published in 1978 by Walter Dick and Lou Carey in their book Systematic Design of Learning. The components of the systems approach model, also known as the Dick and Carey model, are as follows:

✓ Define Learning Objective(s): The goal statement describes the skill, knowledge, or attitude expected of the learner.

✓ Conduct a learning analysis: determine what the learner needs to remember and determine what the learner needs to be able to do to complete a particular task;

✓ Analyze learners and contexts: identify general characteristics of the target audience, including previous skills, previous experience, and basic demographics; identify characteristics directly related to the skill to be taught; and perform performance analysis and training parameters.

✓ Write down performance objectives: Tasks consist of behavior descriptions, conditions, and criteria. The goal component, which describes the criteria, will be used to evaluate the student's progress.

✓ Development of assessment tools: goal of testing behavior on admission, goal of pre-test, goal of post-test, goal of practice tasks / practice problems

✓ Development of a learning strategy: pre-learning activities, presentation of content, student participation, assessment

✓ Development and selection of training materials

✓ Develop and conduct formative learning assessment: Designers attempt to identify areas of learning materials that need improvement.

✓ Review instructions: identify bad test items and identify bad instructions

✓ Development and implementation of the final assessment

In this model, components are executed iteratively and in parallel rather than linearly.

As Garton and Graves (2014, p.11) state, "materials are crucial to language learning and instruction (...) yet materials cannot be seen apart of their users." (Emphasis mine.) This argument highlights two crucial qualities of teaching materials that suggest their importance in teacher education: they constitute an essential component of language learning and teaching, and they are dependent on their users (both teachers and learners).

Because teaching materials are dependent, when a (student) teacher is tasked to design them, a variety of contextual considerations must be taken, and they have the ability to elevate designers' thinking about what and how to educate (who/where the learners are; what they are learning).

S.V. Titova notes the need for qualitatively new pedagogical technologies that increase IC competence, taking into account the specification of the requirements of professional standards for all levels of education. For this, it is proposed that teachers undergo advanced training programs in the field of integration of digital technologies into the educational process. To these programs, according to S.V. Titova, the following requirements should be made: reliance on the structure of IC competencies of higher education teachers, taking into account training profiles, focusing on real changes in learning, helping students create their own learning web environment, monitoring and providing professional communication on updating the virtual environment by students. In addition to advanced training courses, it is assumed that teachers should be provided with operational advisory assistance by specialists from scientific and methodological centers, joint research work of students and teachers should be organized, information exchanged on issues of interest and topics of joint projects, access to high-quality educational resources [7].

CONCLUSION

Thus, it is worth concluding that in modern conditions of optimizing education and informatization of society, modeling the educational process through material design is especially important. Detailed elaboration of the content of training based on a deep analysis of the needs of students and the goals of the educational process in specific conditions, careful design of the course, taking into account the active and thoughtful use of multimedia and information and communication technologies in training and continuous evaluation of

performance at each stage of work with educational content and methods used form a reliable basis for creating an effective educational process.

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