
DEVELOPMENT OF A NEW ACTIVITY-BASED INSTRUCTIONAL DESIGN MODEL

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Introduction, Raising the Problem

The advance in the use of technology in the classroom has led to traditional pedagogical frameworks taking something of a backseat. This is despite the realisation that the benefits to learning and motivation attached to e-learning solutions are not as unequivocal and evident as originally supposed. This is reflected in the findings of the PISA Students, Computers and Learning (OECD, 2015) report which shows that inappropriate ICT methodological solutions may negatively impact on student learning. Effective ICT application is also hindered by the fact that attention is always focused on the latest technologies instead of the issue of digital tool use which is based on evidence and research. This results in new technological tools – at the end of the activities described by the Hype cycle (Gartner, 2015) – being superseded by the appearance of new technologies before there has been the opportunity for the former's implementation and effective application. In the rare cases that good practice occurs and successful e-learning solutions are implemented, it can be observed that the scientific elaboration of methodological parts is treated with equal importance through the use of the latest technology.

With the widespread adoption of e-learning, the necessity for more research into its effectiveness and quality, and into the operation of an efficient market, has arisen. In order to improve quality and assess impact, it is paramount that methodological approaches are revised and to utilise the findings of previous research on theories of education, instructional design and the psychology of education.

In the case of e-learning curriculums, instructional design is often reduced to the use of multimedia documents, animations and other pseudo-useful, pseudo-interactive and, quite often, self-serving content. However, instructional design is concerned with the structuring and logical ordering of content, on conscious planning and on the visual phrasing of activities connected to content and learning tasks. At the same time it can be used to assess current levels of knowledge, is designed with an awareness of the educational purpose in mind, while all the time matching and adapting available methods. It is undertaken with an awareness of psychological and pedagogical cognitive theories, and with knowledge of appropriate techniques.

Central to instructional design models is the belief that the educational environment and the development of the learning process should be built on describing and analysing student needs and on taking students' particularities into account. Not only do these models determine the students' activities within the curriculum, but they also define the whole process and development of the educational environment and also indirectly influence the learning process. In the education process it is necessary to define the forms of feedback associated with the solution of learning activities and continuous formative evaluation, as well as the qualifying evaluations at the closure of certain phases of education with the help of the models. The educational environment based on instructional design models is indeed a complex education system, a system which also elaborates upon the planning of the learning process for the students.

In short, then, the application of modern instructional design models is necessary for relevant, up-to-date and effective e-learning solutions (Horton, 2011).

Goals

With the development of our own instructional design models, we have several aims unachievable with previous models. By developing the Nexius model our goal was to create a modern instructional design model, which can also operate in the market and not just in the world of non-profit state schools.

The contradiction between the innovative world of experiment and the predictability and stability required of e-learning services can only be uncoupled with the application of project-based, digital content-developing models. In this approach there is the opportunity to effectively harmonize planning, development and utilization while at the same time validating professional results within realistic frameworks. Innovative technological solutions can coexist with established principles of instructional design and content-development, while avoiding the risk of management issues. Project-based thinking can only utilize professional results in development if it approaches the learning process of the student, his learning tasks and his actual learning activities in an integrated manner instead of the concept of the conventional shared educational environment. The integrated educational environment is part of our instructional design model.

The project-based development of our instructional design, digital content-developing model is exclusively focused on an online educational environment and within that it targets the more effective development of a content-centred, instructive educational environment which supports individual learning. The online educational environment is effective for the student if it is optimized for the solving of learning tasks and learning activities. It offers opportunities for the regulation of educational process, in qualitative information-flow, in the repertoire of learning activities and in the individual activities of the students, making it unnecessary for students to engage with other educational environments or to look for other interactive opportunities in order to achieve their learning goals.

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The main principles of our instructional design model are the following: individual learning, developing an optimal educational environment for the individual, adjusting e-learning curriculum development to individual requirements and to expected student activities. The development of an e-learning curriculum in an online educational environment is ideal only if the advantages of cognitive theory, educational psychology and project-based development can prevail in developing educational content and in planning education generally.

The proposed Nexius instructional design model blends the teaching-learning-centred models (Bloom's taxonomy, Merrill's educational principles) with the development-production-centred models (ADDIE-, Dick - Carey - model) the purpose being to widen the scope of the individual models. It implements curriculum development via the project-approach taken from the world of business, thus merging the features of project management and instructional design. Not only does it provide theoretical solutions, but it also supports curriculum developers and practical implementation with concrete tools and advice during the course of application. It incorporates the latest results of psychological and pedagogical research, instructional design and digital multimedia curriculum development.

Methods

The necessity to develop the Nexius model was driven by practical needs under market circumstances. Although the developers considered each developmental project unique, in order to ensure quality and cost-efficiency it was thought practical to introduce steps which could be standardized.

For the development of the model, the developmental experience provided by more than a thousand pages of curricula was processed by those working on Nexius. The projects were analysed qualitatively: small-group and in-depth interviews were undertaken and the work processes of different projects were examined and compared with content-analysis. We mapped the tasks and roles of certain individuals in the process of development. The tasks were grouped, unified and put in logical order. The results were analysed and specified in cooperation with a didactics specialist and we established the modern education-methodological background and its base.

The Nexius Model

The model uses and applies current cognitive theories, theories of learning methodology, visual-communicational rules and instructional design solutions. Its principle is to represent an activity-based pedagogy based on motivating the students; it attempts to build a bridge with student's existing knowledge while trying to open paths to digital-based motivational opportunities (Ollé, Kocsis, Molnár, Sablik, Pápai, & Faragó, 2015).

Compared with previous methods, the Nexius-model approaches instructional design differently. It combines education-methodological support and organizational process focus.

The model consists of 6 steps (Figure 1). Each step is completed with the establishment of a well-defined sub-product. These milestones are the exit documents in their establishing phase, and on which the next phase of the process is built, thus they are its access documents. There is only one exception to this, which is the synopsis:

- Milestone 1 is the Synopsis: in the writing phase of the Synopsis - as its name suggests- the synopsis of the curriculum (an overview) is developed. The description of the curriculum requirements, the definition and setting of its content elements and the circumstances of its application are expanded on here. This is the first sub-product of curriculum-development, the base-document of the curriculum.
- Milestone 2 is the Script: in this step the educational content is developed, which is created based on the goals and syllabus set in the synopsis phase and which is methodologically sound – although its structure is not final – and it provides the foundation of and the background to, the curriculum. It is the second sub-product of the developmental process.
- Milestone 3 is the Activity Plan: in this stage, the educational content is further refined with methods developed for electronic curricula. The concept of the student’s interaction with the curriculum is elaborated in this phase. The draft of the electronic educational content – divided into lessons – is developed at this milestone, it is not yet complete enough to be included in a curriculum-developing system.
- Milestone 4 is the Screenplay: the draft, which was developed in the previous step, is further structured. The opportunities of the curriculum–development system, selected for the curriculum planning, have to be considered during this process. Therefore in the process a textual description of the electronic educational content – is developed from the exit document of the previous phase. This sub-product already contains the description of the final, editable texts as well as the media-elements.
- Milestone 5 is the Electronic Curriculum: the first version of the electronic curriculum is developed via Creative design. The material developed over the previous steps is fleshed out and attains real form here with the help of technology supporting curriculum-development and with the assistance of editors and IT specialists.
- Milestone 6 is the Finished Curriculum: in the last phase of the process, the final version of the Electronic Curriculum, the Finished Curriculum is developed after checking, testing and error-correction.

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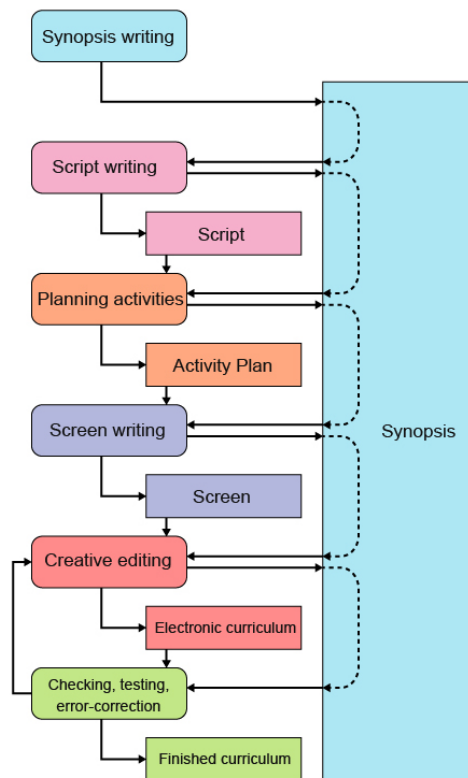


Figure 1. The Milestones of the Nexus-model

In the model, the sub-steps within the main steps are clarified in full: why they are necessary, how they are prepared, their makeup and what requirements they have to meet to be acceptable.

The model also delineates the activities of the participants. It separates the different functions, while stressing that a person can have more than one function. The exact number of people participating in the development can vary, although each function has to be present in each case.

The model defines the following roles: procurer; project-leader, project manager; instructional designer, educational expert; methodological expert; subject matter expert; screenwriter; editor; proof-reader (linguistic, professional, technical, educational); student testers.

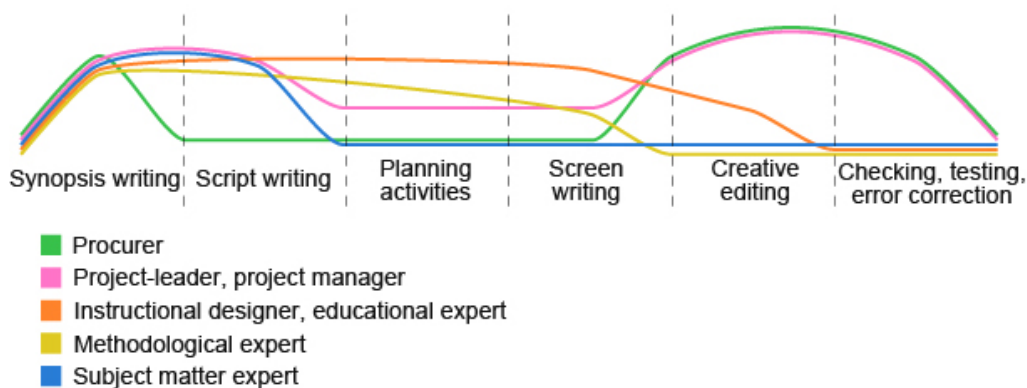


Figure 2. The illustration of how the different participants are represented in certain phases of the project

Scheme Groups and Curriculum Schemes

The methodological, instructional design background of the model is anchored in the curriculum-scheme system, which adjusts the methodological framework and concrete guides – which will be used in practice – to the particular conditions by taking different parameters into account regarding implementation.

The curriculum-scheme framework allows for different methodological approaches by taking the educational goals, the particularities of the students and other features into account. Based on the above parameters, we define which 4-4 curriculum scheme out of the three main scheme groups (regulated-, adaptive-, discovery learning) will be applied in the course of development. The curriculum schemes are grouped based on the relation to the students and on the ideas about learning. Each curriculum scheme focuses on a different understanding of the learning process and as such cannot be combined, so a decision in favour of one has to be taken during the process of curriculum development.

The Three Main Scheme-groups

Adaptive learning

In the adaptive scheme-group the script is primarily knowledge-based, access to the curriculum is not excessively strict. It is possible to count on the student's learning experience and motivation, but the work with the curriculum follows a pre-defined path. The curriculum conveys concrete knowledge with little emphasis on the abstract, and a rigid internal system. The educational aims are elaborated through the medium; we can clearly state the concrete aim and role of each and every chapter and lesson (even to the extent of comparing it with others) in the curriculum.

Sub-schemes:

- Information-transferring;
- Inductive;
- Deductive;
- Integrating.

Regulated learning

Tasks, which are appropriate for practice, are dominant in the regulated scheme group and access to the scheme group is somewhat restricted. It is suggested that for such a scheme each and every step of the learning process has to be directed. If it is important that each step of the student is directed then the flow of learning has to be influenced the most. The curriculum is presented in a highly regulated manner within the framework. The curriculum's system of concepts is tied, the inner structure of the curriculum either cannot be or can only slightly be altered and the curriculum greatly resembles the students' book or an advanced-level practical book. The educational goals suit the content well. Learning with this curriculum means it is easy to discern at any stage what the aim is and to what extent it contributes to achieving the educational goals.

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Sub-schemes:

- Practising, developing practice;
- Teaching activities and actions;
- Developing competency;
- Optimal acquisition.

Discovery learning

In the case of the curriculum belonging to the discovery learning scheme-group, curiosity-arousing and interesting tasks, those which make you think, have to dominate. The student decides what path he wants to take in this curriculum scheme. This curriculum is effective if the responsibility for learning can be placed squarely on the student. The curriculum is generally small and rather general, it contains open-ended questions and it is not possible to prepare exercises to check progress. The teaching content, the inner structuring of which can be re-ordered randomly and typically has instructive parts, belongs in this group. In this scheme the aims are general, in most cases there are affective requirements or cross-curricular aims regarding the whole curriculum are elaborated.

Sub-schemes:

- Processing experience;
- Problem-solving;
- Explanatory analysis of case-study;
- Sensitization and view-formation.

Present and Future

The practical application of the model has already commenced. Our present aim is to justify the model with research and, depending on the findings, to adapt it. In order to examine the curriculum scheme's system, research is planned which will compare the performance of a single curriculum framed within different schemes, thus providing an opportunity to justify the existence of certain categories. Based on the initial results, the effectiveness of the developmental process has increased; it can be characterized by more conscious planning, more effective sub-processes, a quality curriculum and customer satisfaction.

References

1. Gartner, G. S. (2015). Hype Cycle for Emerging Technologies Maps the Journey to Digital Business (2014).
2. Horton, W. (2011). *E-learning by design*. New York: John Wiley & Sons.
3. OECD (2015). *Students, Computers and Learning: Making the Connection*. Paris: PISA, OECD Publishing.
4. Ollé, J., Kocsis, Á., Molnár, E., Sablik, H., Pápai, A., & Faragó B. (2015). *Oktatástervezés, Digitális Tartalomfejlesztés*. Eger: Líceum Kiadó.