

ADAPTING THE *ADDIE* INSTRUCTIONAL DESIGN MODEL IN ONLINE EDUCATION

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ABSTRACT. The instructional design approach should begin with requirements evaluation to evaluate the necessities of the online learning event, such as what the learner should understand and be capable of doing as an outcome of the education or understanding solution and what learners immediately understand and can perform.

Instructional designers widely use ADDIE to create modules, models, software, and courses for instruction and learning. It is also used as a design model. It presents a series of repetitive steps to build effective education and training in five phases, giving rise to the acronym: A-D-D-I-E, which stands for analysis, design, development, implementation, and evaluation.

Key words: *instructional design, e-learning, ADDIE model.*

Introduction

As a definition, instructional design = ***is the act of anticipating and prefiguring the teaching approach to achieve an effective prefiguration of the knowledge strategy.*** (Gagné, 1965) We can use several models in developing an instructional design, such as ADDIE and SAM (Okey, 1991).

An instructional designer employs this systematic methodology (based on informative assumptions and prototypes) to establish substance, knowledges, and additional answers to aid in acquiring new knowledge or skills (Okey, 1991).

Instructional design ***should commence by coordinating a necessities appraisal to ascertain the requirements of the online knowledge instance, encompassing what the learner must understand and perform as an outcome of the preparation or mastering answer and what learners immediately understand and can perform*** (Buscombe, 2013).

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Instructional plan is mindful for making the course plan and creating all preparing materials, counting introduction materials, learner guides, presents, work helps, etc. It goes more frequently than ever in charge of assessing the preparation, which incorporates deciding what was learned and whether the learning arrangement brought about in quantifiable conduct alter (Buscombe, 2013).

The instructional design ***follows a needs assessment system, process design, materials development, and effectiveness evaluation***. To maximise the learning experience and knowledge transfer, instructional design necessitates analysing and choosing the particularly suitable strategies, methodologies, and technologies (Buscombe, 2013). A guidelines plan continues, and the portfolio should incorporate the information and aptitudes required to effectively plan a web learning activity (Gagné, 1985). In the future, whether creating online instruction or an on-demand execution back arrangement, taking after sound ISD forms will offer assistance we make way better and more fruitful arrangements (Buscombe, 2013).

Organisations and their learning functions evolve in tandem with the pace of change. Flexibility, creativity, and innovation are all becoming more valuable. As an outcome, ***intelligent and perpetual design patterns are gaining traction*** (Gagné, 1985). The instructional design also ***borrowes additional components from the fields of user experience design (UX) and design thinking***. While several instructional design models and processes, many components are similar. These are the following: analysis, design, development, implementation, and evaluation (Buscombe, 2013).

THE ADDIE MODEL

Instructional designers widely use ADDIE to produce modules, models, software and courses for instruction and learning (Morrison et al., 2010). It is also used as a design model that presents a series of repetitive steps to build effective education and training in five phases, which creates the acronym: A-D-D-I-E stands for ***analysis, design, development, implementation and evaluation*** (Rossett, 1987; Gustafson & Branch 2002). (Figure 1).

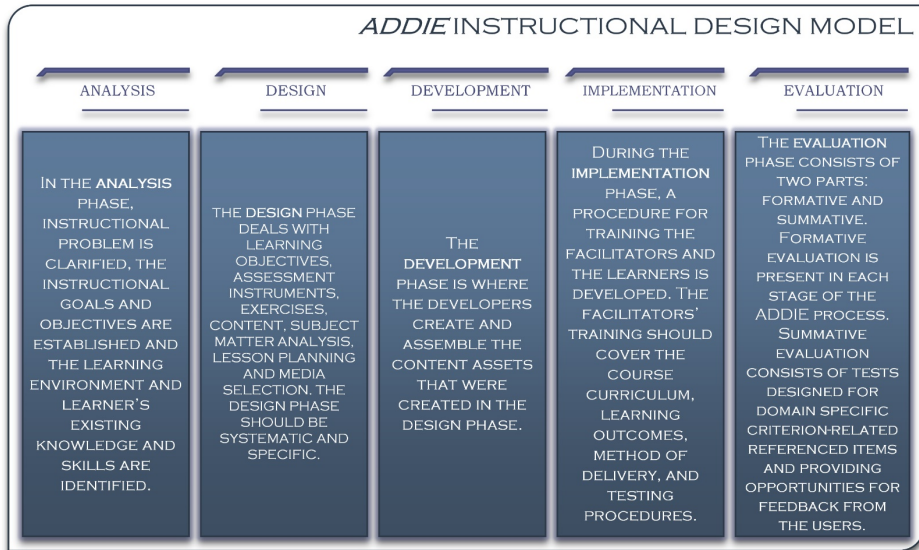


Figure 1. ADDIE Instructional Model

(Adaptation after www.instructionaldesign.org -

https://www.instructionaldesign.org/models/addie/#google_vignette)

RCM's goal in incorporating the ADDIE model is twofold: **to improve teacher instructional strategy and student academic performance**. RCM intends to provide teachers with guidance for using the concept map construction method in the schoolroom and basic surroundings. This investigation is anticipated to assist students in shifting their knowledge patterns from rote understanding to constructive concept learning, which requires them to actively engage in the knowledge procedure (Gustafson & Branch 2002).

Training and exercise are crucial elements of patient security, both as potential contributors to injury risks and hazards and interventions to eliminate or prevent such injuries. Too often, we have relied solely on education as the single involvement for patient security without considering other options or realising that, in some cases, the training systems are inadequate. **Applying established design principles to education and training is one way to ensure safety by design**. ISD (instructional systems design) is a methodical approach to creating educational materials, developing education and training programs to improve student performance. The ISD process consists of five interconnected steps: analysis, development, design, implementation, and evaluation (ADDIE). (Briggs, 1975).

Careful consideration of the role of education and training, both as a potential latent system hazard and as a possible intervention, is needed to maintain patient safety. As a result, ***educational and training activities must be carefully planned***. to be effective (Coulter, 1990; Duan, 2006; Levinson, 2010).

The ADDIE show may be a nonexclusive, precise, step-by-step system utilised by guidelines originators, designers, and coaches to ensure that course advancement and learning don't take put in an advertisement hoc, unstructured way (Reason, 1997).

This model is designed to provide:

- learners achieve course objectives;
- assess learner needs;
- design and development of material instruction;
- evaluation of the effectiveness of instruction using specific programs (Reason, 1997).

The ADDIE informational design prototype offers ***a stepwise procedure that assists practitioners plan and creates education schemes***. The ADDIE pattern model rotates across the succeeding five elements (Reason, 1997):

Analysis phase

While most designers prefer to begin with the more enjoyable phases first, it is essential to avoid skipping these earlier, research-based phases and steps. So, to begin, what analysis of the topic do we need to perform (Reason, 1997).

Instructional designers have addressed these three critical analyses (Reason, 1997):

- a. Training Needs Analysis: not only to determine if training is needed but to identify and measure performance improvement expectations.
- b. Audience Analysis: if training is needed, the next step is to analyse the students. Understanding your audience's primary demographics and background can help you determine the best delivery method.
- c. Task analysis: once you know the purpose of the course and understand more about the students enrolled, you can successfully move on to the next steps of the ADDIE instructional design model. You will instruct learners by breaking down the process into a step-by-step format.

This phase is intended *to define project needs and existing constraints*. Its primary goal is *to explain informational issues, found purposes, and recognize the knowledge environment, containing the learner's subsistent understanding, abilities, and information*.

Here are some of the concerns commonly interviewed during this phase:

- Who is the intended audience?
- What are their skills and characteristics?
- What do they need to learn?
- What kinds of constraints exist?
- What is the deadline for completion?

Design Phase

We should know how and where the information should be presented during the design process. This usually means designing the course outline. We should also understand the general connections between text, media and navigation (Yadla & Rattigan 2003).

This stage is essential for *addressing the training objectives*. Various variables perform a critical involvement in the design phase of online courses, including:

- Time;
- Budget;
- Resources;
- Inspirational bibliography (Yadla & Rattigan 2003).

Based on the period allocated in favor of the training, we determine approximately how much time we will have for the duration of the program, taking into account the instructor's pace, the format of the course, and the mode of delivery, adjusting the content and design accordingly (Elsayed et al., 2010).

We develop participant evaluations, the program evaluation methodology, data collection method, and reporting formats that will be used to assess mastery of the tasks to be taught (Davis et al., 2013).

If possible, we conduct mini knowledge presentations to validate the program for meeting designated learning requirements.

Development Phase

Electronic learning or e-learning is a current way of developing education in line with technological breakthroughs. A concise definition of

e-learning can be ***the provision of education, training or learning by electronic means*** (Davis et al., 2013).

Nowadays, the term is also unifying for many learning techniques and computer-assisted instruction. E-learning refers to Internet technologies ***to provide a wide range of solutions that enhance the performance and knowledge of medical and pharmaceutical students*** (Davis et al., 2013, Piskurich, 2015).

In general, ***e-learning is synonymous with online education*** and web-established knowledge.

In a broad sense, learning/online technology refers to applying scientific findings to solve practical problems. In detail, it can appear stated that informational tech refers to the teacher's approach to using ***learning principles in a practical training situation***.

From our viewpoint, ***didactic technology is not limited to the use of technical means for the transmission of information***. However, it includes all the components of the teaching process in a single whole, removing certain artificial boundaries between them, insisting on the interdependence between content, theoretical information and practical information, and organisation, teacher-student relations, methods and procedures used.

The teacher-student relationship should be close, and there should be free discussion and exchange of opinions. A good teacher ***must know how to choose to make the teacher-student relationship as effective as possible*** in the career of future physiotherapists.

The teacher has to give the student confidence in his strengths, gain courage, make him engage in a communicative relationship, and succeed in engaging him in a constructive discussion. It is necessary to transmit to students a thirst for knowledge, for something new, a willingness and flexibility in thinking, and a desire to communicate (Davis et al., 2013, Okey, 1991).

The teacher must consider the students' opinions, wishes, aspirations and expectations, and personalities, and there must be free discussion and exchange of views.

The teacher's application of the modern principles suggested by contemporary psychology in teaching is an aspect of teaching technology to the same extent as learning machines, computers and other technical means.

Because of this, its renovation is addicted around the teacher's direct activity. Whatever modification is introduced, still the highly state-of-the-art technical means, its effectiveness depends not only on the change itself but also on how the teacher has exploited it by directing it following the objectives pursued (Davis et al., 2013).

In e-learning, classical teaching is enhanced with technology through the university teacher's access to different platforms, programs for the creation and education of online courses, access to information and web searches, video projectors for the most transparent and most concise presentation of information, through images, videos, diagrams or tables (Davis et al., 2013, Piskurich, 2015).

We believe that running digital courses should be a task done with care. After considering the learning objectives and pathway, the next step would be to choose the appropriate modality for the learning objective (Davis et al., 2013).

We have to prioritise the topics (Davis et al., 2013):

- The virtual live classroom should be used for discussions and practical skills sessions;
- E-learning courses or stimulus-response learning sites would be an excellent delivery method for terms and concepts;
- In the case of online courses, it is advisable to take into account the technological capabilities/limitations of learners' remote locations;
- For example, screenshots or an animated PDF would be more effective in delivering information to learners.

The following notes characterise e-learning methods (Davis et al., 2013):

- prioritises the development of learners' personalities, targeting the formative side of education;
- they are centered on the student's learning activity;
- they are action-centered, learning by discovery;
- are process-oriented;
- are flexible, encouraging cooperative learning and self-assessment in students, with assessment being formative;
- stimulate intrinsic motivation;
- the teacher-student relationship is democratic, based on respect and collaboration.

The advantages of this type of learning are the following: accessibility, flexibility, convenience, the user can decide for himself the date and time he engages in the learning activity. Compared to the traditional learning system, e-learning has many advantages (Piskurich, 2015; Okey, 1991; Ng, 2014):

- Geographical independence, mobility - the possibility to access the content of the educational material from anywhere and anytime with the help of a personal computer and network;

- Online accessibility - an important feature specific to this type of education, by which is meant access to education via the Internet in real-time, from anywhere and anytime, 24 hours a day, seven days a week; there is no time dependency;
- Concise and selective presentation of educational content;
- Individualisation of the learning process - each learner has their own pace and style of assimilation and relies on a particular type of memory in the learning process (auditory or visual); learning can be done gradually and repeatedly, with rapid progress being monitored and immediate and continuous feedback; some subjects perform better at weekends, others in the early hours of the morning;
- Diverse pedagogical methods - e-learning programs should be based on various pedagogical approaches, guiding learners throughout the learning process: from the completion of learning materials to the completion of projects, to online assessment, to certification, if applicable; several experiments studying the effect of using different media on learning have concluded that, in general, 80% of diverse learning material is retained through listening, viewing and interactivity;

General aspects of e-Learning

- Online administration - the use of e-learning systems requires ensuring user security, user registration, student monitoring and monitoring of network services;
- Low distribution costs - educational software or e-learning solutions are not cheap. However, their prices are lower than those involved in a 'traditional' learning session, as travel costs, rental, of course, premises, accommodation and meals for the subjects are eliminated;
- Reduced study time - in some cases, depending on the technical solution adopted, time can also be counted as a cost-saving: the subject will not interrupt their professional activity to attend a course but will "lose" only a few hours a day to learn online or offline on the computer; - Synchronous and asynchronous interactions - the two types of exchanges between instructors and trainees can complement each other;
- Diverse, dynamic technologies - these allow for robust and real-time feedback and formative and summative, qualitative and quantitative assessments, carried out quickly and by the most knowledgeable assessors;
- Whereas traditional education is organised by age group, the subject is organised in online education; a virtual classroom can bring together subjects of all ages and backgrounds, regardless of spatial boundaries (Khadjooi et al., 2011).

1. Disadvantages of e-learning are: (Buscombe, 2013; Condell & Elliott, 1989)

- The high dropout rate of students - this type of distance education requires consistent and sustained efforts from all participants in the instructional process. Students need to be highly motivated; otherwise, the dropout phenomenon is more common in distance education than in traditional education.
- Several factors can influence dropout, and that can be exploited to limit this trend: - presence - the tutor and the student must be present even in a virtual community; - equality - this must be manifested in that the tutor will moderate the activity so that all participants have the opportunity to intervene in a particular topic of discussion; - most minor possible working groups - allowing a better division of tasks and activities; - teaching style and degree of knowledge acquisition is an essential factor. This means using online course formats specific to this type of education and adapted to the knowledge of the subjects.
- Requires experience in computer use - learners must have some IT knowledge. In most cases, installing an e-learning system requires the installation of additional applications or environments that require other technical knowledge. To minimise this disadvantage, the client can use a web browser. There are cases where this approach is not possible. In this case, it is necessary to modularise the application to produce an installation kit and a user guide. If the system has many, not modularised functions, the user is reluctant to use them, consequently reducing its efficiency.
- High design and maintenance costs include expenditure on technology, network transmission of information, equipment maintenance, and necessary materials production. However, with all the costs involved in the traditional educational process, these are much lower (Miner et al., 2015).

General aspects of online:

Despite these disadvantages or limitations, the experience of already functioning e-learning platforms has shown that learners in education through new e-learning technologies quickly become familiar with the virtual environment and relatively promptly get into the natural rhythm of transmitting and acquiring knowledge through this modern, efficient type of education.

The development phase is ***the actual production and assembly of the materials that have been developed in the design phase*** (Miner et al., 2015).

At this point, it is essential to include whoever is responsible for the items, timelines and deadlines. All audio, video and course materials are collected, prepared, created, and ready for testing in this phase (Miner et al., 2015).

At this stage, we need to consider the following:

- List the activities that will help the target audience learn the task.
- Select the most appropriate teaching method for the learning group.
- Develop training aids and training courses.
- Corroborate the information and display to guarantee that it meets all the aims and objectives.
- Develop instructor guides, learning guides, tools and resources for participants.
- Prepare trainers and mentors who will assist with the training (Belfield, 2010).

Implementation Phase

The implementation phase is ***the stage where the developed course is put into practice, and the final product, developed based on the needs and errors discovered during testing, is presented to the target audience*** (Belfield, 2010).

Relying on the dimension of the readership and the quantity of time and resources allocated to this process, the following considerations should be taken into account the day before or the morning of the presentation day:

- Preparation of the delivery platform.
- The learning environment, i.e., the platform, should be prepared before the learners are connected.
- Ensure the Web connectivity is active and functional.
- Completion of the training session (Gustafson & Branch, 2002).

Evaluation Phase

The evaluation phase ***evaluates suggestion from the students***. The suggestion collected in this phase measures feedback, identifies what works and does not work, ascertains the efficaciousness and attribute of distribution, and is developed to adjust the program (Reason, 1997).

It substantiates whether or not the curriculum has encountered its goals and the argument of the education information used (Reason, 1997).

It discovers whether learning went as planned and can also uncover any obstacles that may have occurred.

Some or every one of the audience must be featured in the evaluation:

- Where are the information and message presented clearly and understandably?
- Were the examples, illustrations and demonstrations practical?
- Was the information presented personally relevant to the learner?
- Was the training exciting and, particularly meaningfully, encouraging?
- How performed the guidance influence the learner? If quite, in whatever way? If not, how come not?
- What changes should be made?
- What was the most critical aspect of the information showcased to the learner? What appear the least significant?
- What changes, modifications, or adjustments would the learner make?
- Collect evaluations, and review program data;
- A decent assessment of project outcomes at this argument might succumb affluence of data which can be utilized to refine and ensure the success of future presentations (Reason, 1997; Briggs, 1975).

ONLINE LEARNING

Today, digital information can be found almost anywhere and is accessible to almost everyone. In this age of information technology, medical education now faces new challenges. The online explosion of healthcare information forces students to update their knowledge constantly (Battles & Mandle, 1986). Medical technology informatics competency requirements, such as electronic medical records, learning systems, and assisted diagnosis systems, present a new challenge for medical students (Battles et al., 1989; Triola et al., 2010)

The teaching methods used to educate and train students should be continuously optimised to prepare qualified individuals for today's environment where the Internet provides ubiquitous digital information. Despite the truth that this form of information technology has already been used to support instruction, traditional teaching methods require that teaching and learning coincide. Because of moment and corridor constraints, online learning separates teaching and learning via internet-based information delivery systems. In higher education, both digital and offline instruction methods are widely used (Thompson, 2013; Daniel, 2012; Cook et al., 2008).

Many factors influence the efficaciousness of electronic education. Some elements create barriers to online learning, such as administrative issues, social interaction, academic skills, technical skills, learner motivation, study time and support, technical issues, costs, and internet access (Bartley & Golek, 2004; Mayer, 2002).

Over a previous couple of months, because of the bottlenecks caused by COVID-19 worldwide, society has faced significant challenges that have inevitably affected education. Online learning has gained ground, and **communication technologies have become indispensable for maintaining continuity in schools and work areas**. As significantly as the discipline of education is concerned, these rapid and perhaps unexpected changes could have created several difficulties in ensuring the effectiveness of both teachers and students (Hasan & Bao, 2020; Rapanta et al., 2020).

Online environments for teaching and learning **can be effective**, but **only when the conditions are known under which teachers can successfully proceed with education**. Motivation is the psychological mechanism that activates how a teacher acts. It is an external or internal determinant of their behaviour and the actions of other regulatory agencies. The outcome of all motivational dimensions will affect any professional activity in a specific way (Hasan & Bao, 2020; Rapanta et al., 2020).

In the circumstance of online education, primary consideration has appeared reimbursed to the behaviour of continued use. Therefore, it is recognised that many variables affect the adoption and long-term use of online learning (Bhattacharjee et al., 2008).

THE ADDIE MODEL ADAPTED TO E-LEARNING

In just a few years, online teaching has evolved from an academic experiment conducted by a few instructors to an alternative learning method. Even traditional classrooms have embraced many teaching methods popularised by online education, such as incorporating and completing online quizzes and discussion forums. **A successful online education must be based on the proper training of both teachers and students using well-defined models** (Dağhan & Akkoyunlu, 2016; Collins, 2004).

The ADDIE model is **a generic training model that provides an organised process for developing learning materials**. This systemic model is a five-step cyclic program that can be used for the successful delivery of online learning (Collins, 2004)

The course **objectives are studied in the analysis phase, gaps are examined, and the audience is identified**. This is an important step; however,

the teacher should first recognise that the Internet has changed student expectations (Dağhan & Akkoyunlu 2016).

These student expectations include increased levels of feedback, increased attention, and additional resources to help them learn. In reaction to fulfill these expectations, alternative teaching and course facilitation methods possess developed to endorse student bonding and encourages learning. For better student learning in the online environment, increased communication between instructor and student is necessary (Dağhan & Akkoyunlu, 2016; Collins, 2004)

These changes in student expectations should be incorporated, as well as the following assumptions, if applicable to the online course:

- The course is conducted online over a regularly held semester or quarter class or a set number of weeks.
- The course is divided into learning modules or chunks of content.
- Student participation is required within a set period - each content module is given a start and end date.
- Learning occurs as students synthesise the prepared material and interact in class discussions with the rest of their peers and teachers.
- With dimensions like these in location, the following stage is the design and development of course materials (Dağhan & Akkoyunlu, 2016; Collins, 2004)

Online teaching *requires significant planning and preparation in the design and development phase* and should not be underestimated as it can obstruct the education procedure. The syllabus is the heart of the design phase; *careful preparation of the syllabus prepares the learning environment* and discourages confusion and miscommunication. In the implementation phase, students are trained so that all the information gained in this critical stage helps improve the course (Grant, 2013).

CONCLUSIONS

1. Given the current situation, online learning and digitisation of information seem to be the best solution for transmitting data, and there are various methods for online learning.

2. However, online education is not as effective as classical education in terms of the interaction between teacher and student or between students, which is not as effective but using specific methods, and models appeared, digitization of information will become an optimal means of transmitting information and learning.

3. To make e-learning effective in such difficult times, we need to focus on more efficient use of technology, i.e., using that technology that has minimal acquisition and maintenance costs but can effectively facilitate educational processes. Before introducing and adopting any e-learning tool or technology, its advantages and disadvantages must be weighed up.

4. It must be recognised that e-learning has advantages for enhancing student learning and should be considered a potential teaching method in medical education. The design principles of digital learning materials, learning objectives, and students' preferences and characteristics should all be rigorously evaluated to ensure the effectiveness of online learning.

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