The BL-5D Model: The Development of a Model of Instructional Design for Blended Learning Activities

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***Abstract*—** It has long been recognized that the creation of any teaching content can be enhanced if the development process follows a pre-defined approach, which is often referred to as an Instructional Design methodology. These methodologies typically define a number of stages, or phases, that an educator should undertake to help ensure the quality of the final teaching content that is developed. In this paper we present a new instructional design methodology that is focused specifically on the introduction of blended resources into a heretofore bricks-and-mortar course. To achieve this, research was undertaken concerning a range of models of instructional design, as well as literature covering some of the key challenges and "pain points" of blending. Following this, our new model, the BL-5D model, is presented which incorporates some key questions at each stage of this five-stage methodology to guide the development process. Finally, a discussion of some of the key themes and issues that have been uncovered in this work is presented, as well as a template for a blended learning case study that emerged from this approach.

***Keywords*—**Blended Learning, Challenges of Blended Learning, Design Methodologies, Instructional Design.

I. Introduction

THE BLITT (Blended Learning International Train the Trainer) project is a trans-European research project whose goal is to encourage educators to use a blended approach in their teaching. It is designed to do this by using a 'train the trainer' approach to help create blended learning champions who will help train and motivate other educators. It also aims to collect and collate a series of case studies that document successes and failures in blended learning activities. To help achieve the goals of the project, a new model of instructional design has been developed specifically to help educators who are developing blended learning experiences for their students, where they are combining "the classroom and the computer" to provide the students with rich learning opportunities. In the following sections existing models of instructional design are presented, followed by a review of literature associated with some of the challenges of blending.

A. Instructional Design

Instructional Design is concerned with the development of the "*optimal methods of instruction to bring about desired changes in student knowledge and skills*" [1], in other words, instructional design is focused on the design, development, and delivery of teaching to help students successfully learn. Molenda, *et al*. [2] describes the history of instructional design, and they see it rooted in cognitive science and cognitive psychology, with some models also incorporating socially constructivist principles also, thus a focus on science and psychology. Merrill, *et al*. [3] emphasize the importance of developing models of instructional design based on scientific principles, and also encourage eschewing ideas that may be appealing, but that have no grounding in evidence, for example, fallacies such as; "*learners are different now than they were several decades ago*" (they aren't), "*group learning is more effective than individual learning*" (groups don't learn, individuals do - learning is an individual event), "*instructional design is a set of procedures that are arrived at by consensus of educators and instructional designers*" (it isn't, it is a set of scientific principles and a technology for implementing them).

One of the oldest and most commonly cited models of instructional design is called ADDIE, an initialism of Analysis, Design, Develop, Implement, and Evaluate [4], which consists of five stages of learning development, moving from the initial conceptualization of the teaching process to its evaluation, as follows:

- *Analysis*: Explore the current situation, identifying both what is going well and badly.
- *Design*: Create different designs to address the gaps in the current situation.
- *Develop*: Select the most suitable design and build the teaching content.
- *Implement*: Deliver the teaching content to students and make changes as needed.
- *Evaluate*: Assess the quality of the teaching content and its delivery.

However, Allen [4] noted that some specific implementations of the ADDIE process have additional features, for example, in some versions, each of these five stages are underpinned by things such as Management, Support, Administration and Delivery, which themselves can be underpinned by a quality improvement processes. Interestingly, Molenda [5] undertook an extensive investigation of the origins of ADDIE, and found that there is no clear origin of ADDIE; no single individual can have been said to create it, but rather, it emerged in the 1980s through an oral tradition of best practice.

A similar model was developed by Heinich, *et al*. [6], entitled the ASSURE model, it consists of six stages of learning development, as follows:

- *Analyse Learners*: The educator must know their learners, including their personal information as well as general characteristics such as competencies and learning styles.
- *State the Standards and Objectives*: The objectives can be described using the ABCD approach, where "A" is Audience (i.e. who is the goal intended for), "B" is for Behaviour (i.e. to what extent learners will learn after instruction), "C" is for Condition (i.e. what conditions will the behaviour be observed), and "D" is Degree (i.e.

to what extent learners will gain this knowledge and skills).

- *Select Strategies, Technology, Media, and Materials*: The educator explores and selects different teaching techniques and technologies to achieve the learning objectives.
- *Utilize Technology, Media, and Materials*: The educator delivers the teaching, and they can use the 5P approach, (1) preview the materials, (2) prepare the materials, (3) prepare the learning environments, (4) prepare the learners, and (5) provide the learning experience.
- *Require Learner Participation*: Create opportunities in the delivery of the content for the learners to participate in the classroom in an active manner.
- *Evaluate and Revise*: Evaluate the learners' achievement and lesson plans for further improvement for the teaching process.

A final model worth mentioning that follows a similar pattern is the Dick and Carey model [7], which consists of ten stages, and is slightly more behaviourist:

1. *Assessing Needs to Identify Goals*: This stage involves identifying the learners' needs.
2. *Conducting Instructional Analysis*: This stage involves looking at what is being taught and what could be taught.
3. *Analyzing the Learners and Contexts*: This stage involves getting to understand the learners.
4. *Writing Performance Objectives*: This stage involves describing the goals of the learning as a series of objectives.
5. *Developing Assessment Instruments*: This stage involves creating the assessment processes to evaluate the learning of the learners.
6. *Developing Instructional Strategy*: This stage involves developing an overall approach to the delivery of the teaching content and should complement to assessment processes.
7. *Developing and Selecting Instructional Materials*: Create new teaching content, where necessary, and identifying pre-existing content where possible.
8. *Designing and Conducting the Formative Evaluation of Instruction*: Refine and deliver the assessment instruments created in stage 5.
9. *Revising Instruction*: Based on the outcomes of the assessment, revise any weaknesses in the teaching content.
10. *Conducting Summative Evaluation*: Undertake a final summative assessment.

As can be seen from the above discussion, many models of instructional design follow a similar pattern with planning, followed by development, followed by evaluation, and the model that will be developed for this research will replicate that pattern, moving from the analysis of the needs to the evaluation of the outcomes.

B. Blended Learning

"Blended Learning" describes a wide range of educational experiences that combine traditional face-to-face classroom teaching with some form of technology-supported teaching [8]. Both styles of teaching can occur either consecutively (i.e. non-overlapping) or concurrently (i.e. overlapping); where the concurrent version is generally distinguished by being referred to as "hybrid learning" [9]. Two commonly used definitions of "Blended Learning" are that it "*combines face-to-face instruction with computer-mediated instruction*" [10, p.5] and that it is "*the thoughtful integration of classroom face-to-face learning experiences with online learning experiences*" [11]. It is noteworthy that the second definition reduces the scope of the technical aspect of blended learning to refer specifically to "online learning experiences" whereas the first one has the broader definition of "computer-mediated instruction", thus including interactions students may have with computers when they are not online. To address this discrepancy, in this research, the non-classroom aspect of blended learning will be referred to as "e-Learning", intending to encompass both the online and offline computer interactions that students may have. Allen, Seaman, & Garrett [12] define blended learning in a quantitative way and state that there should be a minimum of 70% traditional classroom and 30% e-Learning interactions, to a maximum of 20% traditional classroom to 80% e-Learning interactions. However, Hrastinski [13] argues that it is better not to be too specific on what the term means, but rather instead it should be seen as an umbrella term, and it should be accepted to mean different things to different people depending on the specific context.

Using a Case Study approach, Yuen [14] explored different blending approaches that are used in a large Chinese university in conjunction with blended learning, and identified four main approaches:

1. Providing on-line resources
2. Supporting specific pedagogies (e.g. Project-Based Learning)
3. Focusing on on-line discussion
4. Enhancing course management and delivery

He highlights that this is not meant to be an exhaustive list, but rather it underscores some of the blending approaches being used, and the paper emphasizes the complexity of integrating content, pedagogy and technology.

A number of studies have indicated that the introduction of blended learning, in heretofore situations that were classroom-only based teaching, can result in increased student satisfaction and student achievement (e.g. [15]. [16], [17]. [18]). However, some researchers have expressed concerns, including those that contend that the term "blended learning" itself is both ill-defined and misleading (e.g., [19]), particularly with its use of the word "learning" which suggests the focus is on students, whereas, in actuality, blended learning is a model of instructional design, and therefore educator centred. Additionally, Moskal, *et al*. [20] point out that blended learning not only requires the cooperation of the educator and students

to succeed, but if it is to succeed it also needs a wide range of supports that are outside of the classroom, and often outside of the control of the educator, for example, administrative, technical, and organizational support. Hassana and Woodcock [21] expressed similar concerns and also noted that there is a danger with blended learning projects that they tend to prioritise technology considerations, and they tend to overlook or deemphasise issues such as the intended audience of teaching, the teaching content, the learning outcomes, as well as other key contextual aspects of the blending process. Fleck [22] echoes this sentiment, and highlights four key considerations that make the blended process challenging:

- *Cost*: There may be initial high costs for blending, also well as challenges from an organisational perspective, concerning budgetary allocation issues.
- *Copyright*: Blending can raise a range of intellectual property rights issues, including the incorporation of external resources, as well as content created by students, and the issue of the ownership of the completed course.
- *Custom and Practice*: There may be challenges to blended associated with patterns of work, academic autonomy and freedom, and governance arrangements.
- *Conception*: There may be an erroneous perception that blended learning is "second class" teaching in comparison to face-to-face teaching.

Also, Ossiannilsson [23] emphasizes some of the technical challenges associated with blended learning, including issues around reliability, the digital literacy of students, and the question of the digital divide.

Draffan and Rainger [24] propose a model of the challenges of blended learning from both the students' and the educators' perspectives. The student model looks at the students' physical, sensory and perceptual skills as well as their abilities, attitudes, coping strategies, prior knowledge and their technology proficiency. The educator model looks at the course learning objectives, the ability to demonstrate skills or building experience, as well as implicit learning requirements and objectives of the course.

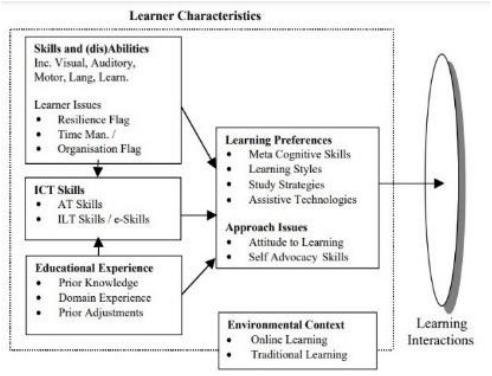

Fig. 1. Draffan and Rainger's Student Model

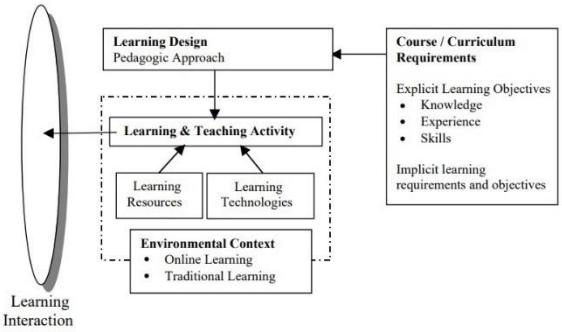

Fig. 1. Draffan and Rainger's Teacher Model

Swartz, *et al*. [25] explored the ethics of blended learning and identified a 5-stage model to describe ethics as being primarily about caring for others:

- *Attentiveness (caring about)*: This stage is concerned with the unmet needs of the participants, to be non-judgmental, and to see things from other people's point of view.
- *Responsibility (caring for)*: This stage is concerned with taking responsibility for responding to the needs that have been identified in the previous stage.
- *Competence (care giving):* This stage is concerned with having the skills to be able to care, which can be a technical, moral and political issue.
- *Responsiveness (care receiving)*: This stage is concerned with listening to the response of the participants that were cared for, and identifying new, unmet needs.
- *Solidarity (caring with)*: This stage is concerned with taking collective responsibility, to think of everyone as both receivers and givers of care, and to look at the caring needs of society.

II. The BL-5D Model

This research proposes a new model of instructional design for developing blended learning content. It is a five-stage model that maps closely to the ADDIE model, but is tuned specifically to blended content, and is based on the challenges identified in the review of literature presented above. It includes questions and prompts at each stage to aid the educator in developing high quality blended experiences. The model also includes aspects of the five-phase model proposed by the Hasso-Plattner Institute of Design (d.school), at Stanford, USA [26], as well as elements of the UK Design Council's Double Diamond Model [27]. In the new model the stages are as follows:

- *Discover*: The is the Analysis stage where a gap analysis is performed.
- *Define*: This is the Design stage where different solutions are explored.
- *Develop*: This is the Develop stage where the teaching content is created.
- *Deliver*: This is the Implement stage where the content is

presented to students.

- *Decide*: This is the Evaluation stage where the content and deliver are assessed.

As each of the stages start with the letter "D", this model is entitled the Blended Learning Five D model, or for short, the BL-5D model.

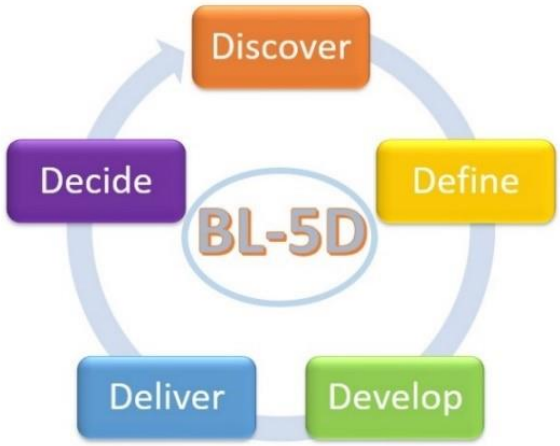

Fig. 3. The BL-5D Model

The BL-5D Framework is as follows:

DISCOVER

This phase is the initial planning stage of the process, and is concerned with exploring if there is a need for blending. So, it focuses on looking at the reasons why or why not an instructor should choose to blend, and if they are going to do it, looking at the extent of blending that can take place. In this phase it is also important to consider how it might impact the students and their learning.

Here are some questions that illustrate this phase:

- What new blended activities are you thinking of doing?
- How will this benefit/impact the students?
- Will the students need to learn any new skills?
- Will you need to learn any new skills?
- Will there be a change in the balance of classroom/online activity?

DEFINE

This phase is the design stage of the process, and is an open discussion of the potential approaches that can be used in the blending process. So, there are no constraints at this stage on what type of blending can occur, and no constraints on the extent of the blending. It is important to consider what organizational processes or procedures may prove to be challenging.

Here are some questions that illustrate this phase:

- Will this new approach mean that some of the learning outcomes might be addressed in new ways?
- Will this impact how the module is assessed (New Assessments or Exams?)?
- What new eLearning techniques will you consider (e.g. videos, audios, quizzes, interactive documents, games, interactive presentations, searching activities, forums, Mind Maps, peer evaluation)?
- What new classroom techniques will you consider (e.g. peer evaluation, debates, role playing, problem solving, case studies, reflection activities, active learning techniques)?
- Will the addition of technology be a Substitution (a direct substitute, with no functional change), or an Augmentation – (a direct substitute, with some functional change) or a Modification (significant task redesign) or a Redefinition (the creation of new tasks previously impossible)?

DEVELOP

This phase is the content development stage of the process, and looks at the mechanics of the blended process. So, the focus is on what can really be blended, using which technology, and how it might impact the students. It is important to consider what organizational technological infrastructure elements may prove to be challenging.

Here are some questions that illustrate this phase:

- How might this impact how you teach the students?
- How might it impact how you communicate with the students?
- What technology skills might you have to learn (e.g. video editing, audio editing, game design, interactivity design, accessibility design, quiz development, digital badges, assessment tools, blogs, wikis, simulations, social media tools, forums)
- What new teaching approaches might you try out?
- How will you deliver this content, e.g. in a Virtual Learning Environment (VLE), on a website, on a USB, in the classroom?
- How will you evaluate the changes?

DELIVER

This phase is the implementation stage of the process, and looks at what is happening during the teaching process. So, the focus is on what is actually being blended, and how it is impacting the students. It also looks at what is going well and badly during the teaching process. It is important to consider what organizational administration may prove to be of benefit or challenging.

Here are some questions that illustrate this phase:

- What was done before?
- What are you going to do now?
- What went well?
- What went badly?
- What surprised me?

DECIDE

This phase is the evaluation stage of the process, and looks at reflecting on what happened during the teaching process. So, the focus is on what went well and what went badly, and what were the key themes and questioned raised during the process.

Here are some questions that illustrate this phase:

- What was the situation before intervention?
- What was the Intervention?
- What happened after the intervention?
- What are the key issues and complexity of the situation?
- Is there any confirming or disconfirming evidence?
- What themes emerged and what questions were raised?
- What reflections emerge (both alternatives and insights)?

III. Discussion

The development of blended learning activities presents many unique challenges, and the BLITT project is designed to help educators create blended activities in a relatively straightforward manner. To achieve this, a two-pronged approach is used, (1) the training of blending champions who will motivate and assist others, and (2) the creation of a repository of case studies of blending successes and failure. To help achieve both of these goals, this paper outlines a methodology for blending content. A number of volunteers from each of the partner institutes involved in this project have agree to take an existing module that they teach in a non-blended fashion, and to incorporate some blended elements into that module. To help them in this process, the methodology outlined above is embodied in a 3-part diary that all volunteers are required to complete, as follows:

- *Part 1 – Before the Blending*: This section of the diary covers the questions raised in the Discover, Define and Develop stages of the process, in other words it asks the educator to present their ideas about the process, and their initial teaching and technology choices.

- *Part 2 – During the Blending*: This section of the diary covers the questions raised in the Deliver stage of the process, in other words it asks the educator to present their reflections on a class-by-class basis of how the blending process is going.

- *Part 3 – After the Blending*: This section of the diary covers the questions raised in the Decide stage of the process, in other words it asks the educator to present their overall reflections on the process, which helps form of a case study of their experience.

So, the volunteers are initially given Part 1 when the agree to participate in the process, and must return it before teaching begins. They get Part 2 once teaching has commenced, and must return it before they get Part 3, which generates a case study from their experience that can be used by other blended learning champions. The structure of the case study is as follows:

TITLE SECTION

- Title of the case study
- Sub-title of the case study

INTRODUCTION SECTION

- Time (chronological information)
- Place (geographical location)
- People (individuals involved)
- Ethics of Case, if applicable

THE CASE SECTION

- Evidence/Sources of Information, if applicable
- Situation before intervention
    - Challenges, issues
- The Intervention
    - Technology, Organizations, Education, Processes & Policies
- After the intervention
    - Outcomes

ISSUES SECTION

- Key issues of the case
- Complexity of the case
- Confirming and Disconfirming evidence

CONCLUSIONS SECTION

- Summary
- Themes that emerged
- Questions raised
- Reflections (what should have been done)

This generic structure means that several case studies can be easily compared to highlight a specific issue, or to contrast different outcomes of different cases, it also means that specific sections in each case can be extracted and used to highlight a specific issue in the training course.

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