Course design in e-learning and the relationship with attrition and dropout: A systematic review

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Abstract: Attrition and dropouts is a major issue in e-learning courses. Dropout rates for e-learning are 15–20% higher than traditional face-to-face courses (Angelino et al., 2007). 'Better e-Learning for All' is an Erasmus+ project that aims to enhance the knowledge about e-learning as a primary environment for adult education. The partnership has been studying e-learning dropout and dropout reasons reported in the literature, in order to propose a suitable approach for course design. In this paper, we will present the way we designed a systematic review of the 'state of the art', as well as some prime findings.

Keywords: systematic review, course design in e-learning, attrition, dropout

1. INTRODUCTION

The problem of high rates of attrition in e-learning courses has been discussed over at length without a clear understanding of the factors contributing to learners dropping out, withdrawing or not completing e-learning courses. Previous research (Lencastre, Bronze, İlin, & Özonur, 2014), suggests that attrition among adult online learners can be classified into two broad categories: (i) factors related to the learner and his/her context, and (ii) factors related to the course design.

The 'Better e-Learning for All' project, an Erasmus+ Strategic Partnership for adult education research, aims to enhance knowledge about e-learning as a primary environment for adult education. Thus, the partnership has been studying e-learning dropout and dropout reasons reported in literature, and the relation with course design, in order to write a suitable 'state of the art' about this theme. This paper presents, in detail, how the review process was designed and developed.

2. METHOD

A systematic review (Gough, Oliver, & Thomas, 2012), is a "literature review that is designed to locate, appraise and synthesize the best available evidence relating to a specific research question to provide informative and evidence-based answers" (Boland, Cherry, & Dickson, 2014, p. 3). Informed by these references, we undertook the review in distinct stages: the development of a review protocol according to the review question, the identification of inclusion and exclusion criteria, a search for relevant studies, quality assessment, data extraction, and synthesis. Subsequently, we describe these stages and its procedures.

2.1. Protocol development

We developed a protocol for the systematic review by following the guidelines of Boland, Cherry, and Dickson (2014). This protocol describes the steps followed for the review: (i) how existing studies are found; (ii) how the relevant studies are judged in terms of their usefulness in answering the review question; (iii) how the results of the separate studies are brought together to give an overall measure of effectiveness (Gough et al., 2012).

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2.2. Review question

We established the following review question: "What´s the relationship between course design with attrition and dropouts in e-learning?"

2.3. Inclusion and exclusion criteria

Studies were eligible for inclusion in the review if they presented empirical data and respected the additional i**nclusion criteria**: Published since 2011; Reviewed by experts and peer-reviewed (to reduce bias); Addressed teacher's course design competence in e-learning courses and related to dropout and/or attrition; Written in English; Full text. **Exclusion criteria was as follows**: Books, book parts, e-books and magazine articles; Published before 2011; No original data; Not addressing course design in e-learning courses and not relating with dropout and/or attrition; Not written in English; Not a full text.

2.4. Literature searching

After consulting a specialist, we were given a list of most reputable databases in Educational Technology:

- ERIC
- ISI Web of Science
- Taylor & Francis Online
- ACM Digital Library
- Science Direct
- SCIELO - Scientific Library online
- B-On portal
- Open Research Online (Open University)

Figure 1 shows the systematic review process and the number of papers identified at each stage:

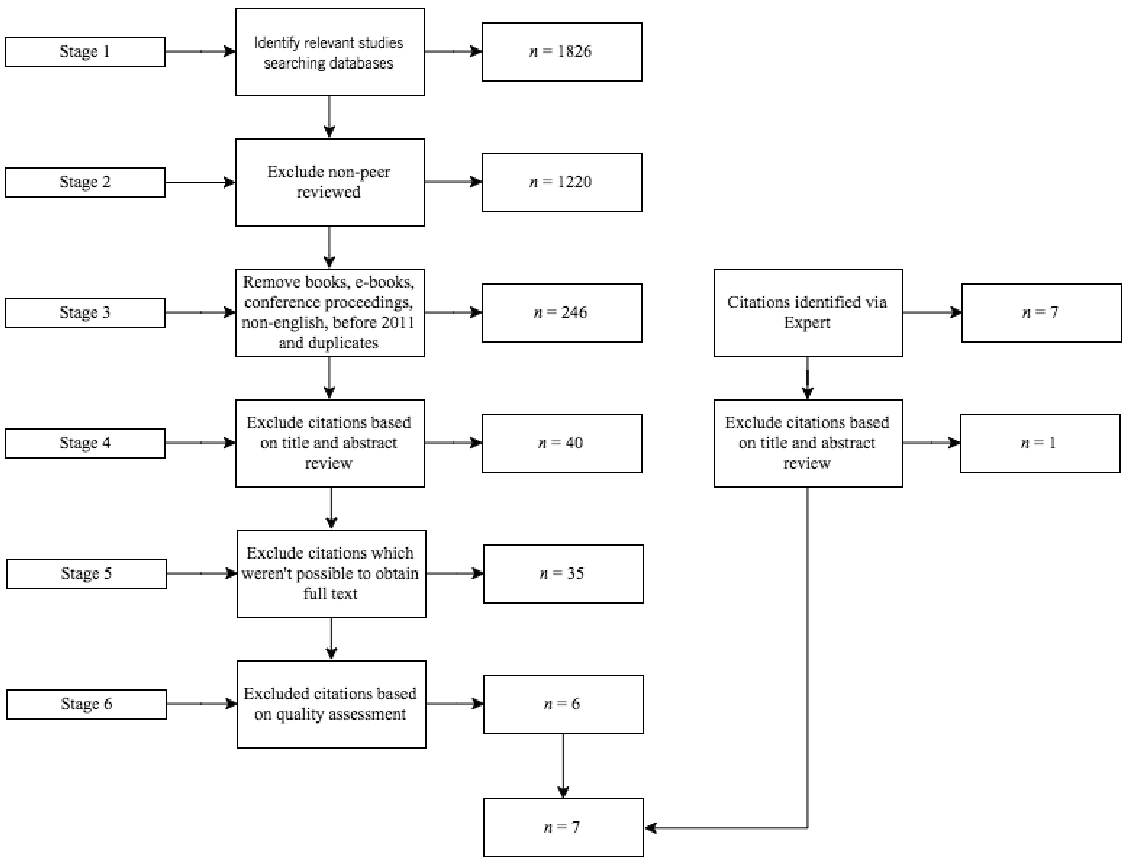

Figure 1 - Stages of the study selection process.

The total of unfiltered results (stage 1), with no inclusion and exclusion criteria applied, was 1826 citations, of which 1220 citations were peer-reviewed (stage 2). In stage 3, created to apply as much as possible of the inclusion and exclusion criteria, a total of 246 unique results were found for title and abstract screening. An excel sheet was created containing the title and abstracts for the 246 results. Two copies for assessment were made, one for each researcher involved in this process, so no prior knowledge of the assessment was known to any of the researchers in order to prevent biased decisions. Each researcher evaluated all 246 titles and abstracts and assigned one of the three possible outcomes: Exclude, Include, and Unsure. The remaining inclusive and exclusive criteria, the ones directly connected with the review question, were taken in consideration. For the 246 titles and abstracts assessed, the number of observed agreements was 0,587 (58,7%). We also computed the Kappa coefficient of agreement, which corrects for chance agreement (Cohen, 1960). The Kappa coefficient for stage 4 assessments was 0,15, which is characterised as "slight agreement" by Landis and Koch (1977). All disagreements were resolved by discussion that included the two researchers, before proceeding to the next stage. As a result of this discussion, 40 citations were considered suitable for further review. However, for different reasons, we only were able to access 35 full papers.

2.5. Quality assessment

For the quality assessment process, we adapted two versions of the **Critical Appraisal Skills Programme (CASP**), Dyba and Dingsøyr (2008), and Qualitative Research Checklist version 31.05.13 (CASP, 2013). The quality assessment was performed by three researchers, using Microsoft Excel and Word. Results were discussed and a final of six citations were selected for content analysis.

Additionally, seven citations were suggested by an *expert* (through research partners). Except for Jusung Jun (2005), untitled UNDERSTANDING DROPOUT OF ADULT LEARNERS IN E-LEARNING, and for different reasons, the suggested citations were excluded.

In the end, we obtained a total of seven articles for the content analysis.

2.6. Data Extraction

After the quality assessment, data was extracted from each of the seven articles. For **Descriptive Data** we extracted title, year, author(s), reference type, and research methodology. For **Analytical Data** we decided to gather modality, goal/objective, scope, action, results, limitations/recommendations and dropout factors and strategies to overcome dropout factors based on the review by Lee and Choi (2011).

2.7. Synthesis

The results were synthesized in descriptive data (see table 1) and analytical data (see table 2).

Table 1 - Summary of descriptive data

Short Citation	**Full Citation**	**Ref. type**	**Methodology**
Deschacht (2015)	Deschacht, N., & Goeman, K. (2015). The effect of blended learning on course persistence and performance of adult learners: A difference-in-differences analysis. *Computers & Education, 87*, 83-89.	Journal article	Quantitative
Flynn (2015)	Flynn, A. B. (2015). Structure and Evaluation of Flipped Chemistry Courses: Organic & Spectroscopy, Large and Small, First to Third Year, English and French. *Chemistry Education Research and Practice, 16*(2), 198-211.	Journal article	Quantitative
Gaytan (2013)	Gaytan, J. (2013). Factors Affecting Student Retention in Online Courses: Overcoming This Critical Problem. *Career and Technical Education Research, 38*(2), 145-155.	Journal article	Qualitative
Jun (2005)	Jun, J. (2005). *Understanding Dropout Of Adult Learners In E-Learning.* The University of Georgia.	PhD Thesis	Quantitative

Table 1 - Summary of descriptive data (cont.)

Short Citation	Full Citation	Ref. type	Methodology
Kalet (2013)	Kalet, A., Ellaway, R., Song, H., Nick, M., Sarpel, U., Hopkins, M., Hill, J., Plass, J., & Pusic, M. (2013). Factors influencing medical student attrition and their implications in a large multi-center randomized education trial. *Advances in Health Sciences Education, 18*(3), 439.	Journal article	Quantitative
Leeds (2013)	Leeds, E., Campbell, S., Baker, H., Ali, R., Brawley, D., & Crisp, J. (2013). The impact of student retention strategies: an empirical study. *International Journal of Management in Education, 7*(1/2), 22.	Journal article	Quantitative
Robinia (2012)	Robinia, K. J., Maas, N. A., Johnson, M. M., & Nye, R. M. (2012). Program Outcomes Following Implementation of a HYBRID CURRICULUM at the CERTIFICATE LEVEL. *Nursing education perspectives, 33*(6), 374-377.	Journal article	Quantitative

Analytical data was classified in three central categories: **(i) Models, (ii) Strategies, and (iii) Dropout correlated and uncorrelated factors.** These categories derived from the following process: (1) initial classification in Dropout factors and Strategies to overcome dropout factors, (2) adapted to Correlated dropout factors, Non-correlated dropout factors, Dropout predicting factors Dropout factors, Strategies used that had an impact in dropout rates based on analysed results, and (3) final classification finding similarities in citation goal/objective and results

Table 2 – Summary of analytical data.

Categories	Sub-categories	Modality	Scope	Citation	Freq.
(i) Models	a) For predicting dropout	Online	Professional Education	Jun (2005)	1
	b) To assess learning effectiveness	Blended	Higher Education, undergraduate	Deschacht (2015)	1
	c) To profile dropouts and persisters	Online	Higher Education, undergraduate	Kalet (2013)	1
Categories	**Sub-categories**	**Dropout**	**Scope**	**Citation**	**Freq.**
(ii) Strategies	d) To blend a face-to-face course	Decreased, Increased	Higher Education, undergraduate?	Robinia (2012), Deschacht (2015)	2
	e) To blend a face-to-face course by flipping the classroom	Decreased	Higher Education, undergraduate	Flynn (2015)	1
	f) For online retention	No statistically significant impact	Higher Education, undergraduate	Leeds (2013)	1
	g) From experts to overcome online dropout	Needs validation	General recommendations	Gaytan (2013)	1
Categories	**Sub-categories**	**Modality**	**Scope**	**Citation**	**Freq.**
(iii) Dropout correlated and uncorrelated factors		Online	Higher Education, undergraduate	Kalet (2013)	1

3. CONCLUSION

In this paper, we presented a systematic review that aimed to find relevant studies that could relate course design in e-learning with attrition and dropout. Initially, from a literature search, we identified 1826 studies but after six stages, and rigorous quality assessment, seven articles were found to be adequate for our research. Descriptive and analytical data were extracted and classified according to various categories. Since the adopted review protocol is so demanding and meticulous, we have focused this paper/text in sharing how we went about this systematic review task. Therefore, we will be reporting the full description of the process and its detailed results in future articles.

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