

Research Article

Designing and Developing an Interactive Syllabus for e-Business Training as Part of Design-Based Research

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Abstract

A syllabus is an arrangement of subjects and a plan for a course of study. It enables visualization of the big picture of the course structure. Syllabi play various valuable functions, including providing information about the communication mechanism between the teacher and students, a planning tool for instructors, a course plan for learners, a source for learning materials or additional readings, a guide that learners can use in their learning both in-class and out-of-class, and it can also serve as a contract or written agreement between learners and instructors or their institutions about learning outcomes. Education today is more interactive, and courses are increasingly multimedia-rich; therefore, syllabi need to be interactive as well. In designing and developing an interactive syllabus for Smart Training for Arabic-speaking Residents on Technology START e-Business Training, learners can visualize the structure of training, search its contents, access frequently asked questions, and explore additional resources. This paper discusses the best strategies used to design START e-Business Training's interactive syllabus and the tools employed to develop it, as a core component of the design-based research DBR methodology. The paper also outlines some challenges in developing an interactive multimedia-rich syllabus, especially with accessibility features, and proposes solutions to overcome these challenges from the perspectives of educators and learning designers. Additionally, the paper explores the iterative process of feedback incorporation and continuous improvement essential to maintaining the syllabus's relevance and effectiveness. By leveraging advanced technological tools and user-centric design principles, the interactive syllabus aims to enhance learner engagement and support diverse learning needs. The discussion includes an evaluation of the pedagogical impacts of the interactive syllabus and its potential to serve as a model for future educational design projects. Furthermore, the implications for broader application in various educational contexts are considered, highlighting the importance of adaptability and innovation in modern educational practices.

Keywords

Interactive Syllabus, ADDIE Model, Design-Based Research DBR, Online Education, e-Learning, Adult Education, Business Education, e-Business Education

1. Introduction

Curriculum, by definition, is concerned with answering a series of specific questions including, but not limited to, what to teach, how to teach, when to teach, what are the learning

outcomes, what knowledge is of most worth to learners, what activities are effective in helping learners acquire knowledge, and how educators can assess whether learners have acquired

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this knowledge [1]. Among different classifications of curricula, there is a subject curriculum, which is a traditional style of combining selected content to be taught from the body of knowledge accumulated in the subject matter [1]. While the curriculum is a broad term, a syllabus is more focused.

1.1. The Role of the Syllabus

The syllabus is a statement about the content [2], which contains a map and a structured presentation of the outline of the curriculum, with specifications of expected standards [3-5]. The syllabi play a variety of valuable functions including providing information about the communication mechanism, a planning tool for instructors, a course plan for learners, a teaching tool, a source for learning materials or additional readings, the purpose of the course, course description, course objectives, a guide that learners can use in their learning in-class and out-of-class learning, and it also can work as a contract or written agreement between learners and instructors or their institutions [4]. It is seen as a contract because it lays out the terms of class interactions, expected duties and responsibilities and grading criteria [6].

For the syllabus to be a motivational tool, the syllabus needs to be intuitive, well-organised and structured [7], aligns with students' interests and learning objectives, and the course materials are connected to real-world applications [8]. Moreover, it was argued that visual/graphic-based syllabi, which include images, graphics, and charts, promote greater information retention than traditional syllabi, and the selection of any visual elements should be relevant [9, 10].

It is argued that the graphic and multimedia syllabus is more powerful in drawing learners' attention compared to the printed syllabus [8, 11]. Syllabi should also consider diversity and inclusion, including offering personalized content and localized content [12, 13].

The learner-centered tone of the syllabus [14, 15], by itself, does not increase learners' engagement, but other factors can also enhance learners' engagement, including having an interactive syllabus [16]. To create a syllabus for a course, there are a number of steps that need to be followed [17]. These steps include 1) Determining the key objectives of the course; 2) Mapping the structure of the course; 3) Creating connections between modules; 4) Balancing between the technical knowledge and the conceptual understanding in each module and the course as a whole; and 5) Including materials that best represent the course objectives.

1.2. The Interactive Syllabus

The syllabus is especially important in online education, as learners are likely to feel somewhat disoriented without a clear guide of what they would face in the online course [6], and it is crucial for online tutors to facilitate interactions (learners-tutor, learner-learner, and learners-content) to help bridging potential gaps in learning processes [18]. The shift

towards interactive syllabi corresponds with changes in educational theories and the integration of technology in the classroom. Constructivist theories, which emphasize active learning and student engagement, have significantly influenced this transition.

An interactive syllabus is a tool that facilitates constructivist strategies in an online course, through progressive engagement with course materials in a non-linear and adaptive process. It was argued that the interactive syllabus is an ideal medium for reflective thinking and cognitive scaffolding, which help learners construct meanings and build new experiences. The interactive syllabus helps learners to easily interact with and navigate the course contents. The interactive syllabus can be integrated into a learning management system or available online, as part of an online course [19]. Additionally, an interactive syllabus provides a dynamic framework that can adapt to the evolving needs of learners, promoting a more personalized learning experience. This adaptability not only enhances learner autonomy but also fosters a deeper connection to the course content.

1.3. Designing an Interactive Syllabus

With the current state of distance and online education, there is a necessity to have interactive learning materials including interactive syllabi [20]. Indeed, the online learning environment provides the opportunity to design interactive multimedia materials [21]. Designing an interactive syllabus has some challenges including overwhelming effort and extensive time [22]. An interactive syllabus is a web-based multimedia-rich syllabus that incorporates texts, images, audios, videos, drawings, charts, graphs, maps, and timelines to visualise the "big picture" of the sequence and organization of course topics. By adding interactivity features to syllabi, learners can navigate and view any course content easily [23, 24]. The use of hyperlinks is vital in interactive syllabi, so learners can navigate the contents of the course [20, 25, 26]. It was advised that when an instructor or instructional designer creates a syllabus designed for an online course, it is essential to write clearly about how to navigate the digital learning environment and any learning management systems [27]. While it was found that the interactive syllabus has significantly improved the students' enthusiasm [28], a printable version is also necessary [29].

The interactive syllabus requires using a set of design skills including word processing apps, presentation apps, PDF apps, photo editing apps, video recording apps, audio recording apps, learning management systems, and cloud systems with the incorporation of different multimedia including texts, images, animations, audios and videos, buttons, hyperlinks, and html, etc [20]. An interactive syllabus can be in the form of a website, which was argued to help overcome overwhelming efforts in developing a syllabus within learning management systems LMS [30].

2. The Theoretical Framework

Despite these roles of syllabi [3-5], there is a notable gap in the literature on the integration of interactive elements within syllabi using a design-based research approach. This paper aims to bridge this gap by exploring the design and development of an interactive syllabus for the Smart Training for Arabic-speaking Residents on Technology START e-Business Training, grounded in the principles of design-based research.

This section synthesizes on the key aspects that include the organization of course content, the role of multimedia in enhancing learner engagement, and the application of constructivist principles to facilitate reflective thinking and cognitive scaffolding. By examining these elements, this section lays the groundwork for understanding the design principles adopted in the START e-Business Training syllabus, and the rationale behind the strategies used to design the START e-Business Training's interactive syllabus. It emphasizes the need for a learner-centred approach that enhances engagement and motivation through multimedia-rich content.

The design-based research methodology was chosen to iteratively develop and refine the syllabus based on feedback and evaluation, ensuring it meets the diverse needs of learners. Furthermore, this approach allows for continuous improvement and adaptation, making the syllabus more responsive to the evolving educational needs. This iterative process not only improves the quality of the instructional design but also fosters a more dynamic and interactive learning environment for participants.

2.1. The Online START e-Business Training

To discuss the need for an interactive syllabus, we need to outline the training, for which the syllabus was designed before we explore the processes of implementing the interactive syllabus and its challenges. START is an abbreviation of an online self-paced training "Smart Training for Arabic-speaking Residents on Technology". This training is specifically designed for the Arabic-speaking residents of Australia, who have work rights, to participate in the training, regardless of their interest in participating in the study, which has received ethics approval from Flinders University's Human Research Ethics Committee (Project ID: 8605).

Learners in START e-business training are unemployed due to various reasons, including lack of English skills, lack of computer/ICT skills, lack of professional skills, and lack of equal opportunity that hinder them from employment. The START training aims to help those unemployed Arabic residents of Australia establish their online businesses, by providing them with self-paced training that enhances their computer/ICT skills and business skills and indirectly English skills, and they then can overcome the lack of equal opportunity they face in employment, by establishing their businesses, using the skill sets, hobbies and interests they master in the business they aim to run [31]. The integration of an interactive syllabus is crucial for

ensuring that the learners remain engaged and can effectively navigate the training material. This approach not only fosters active learning but also helps in addressing the unique needs of Arabic-speakers by offering a more tailored and responsive educational experience.

2.2. Interactivity in START e-Business Training

The designed and implemented START e-Business Training is self-paced. It is interactive as learners can navigate, by clicks, through the contents of each module. At the end of each module, learners can answer a quiz, and they have the opportunity to repeat answering the quiz. Moreover, learners have the opportunity to engage in an online forum, where they can communicate with each other and with their trainer online. Learners have the opportunity to join an online support group. Since the START e-business training is online and interactive, there was a need to design an online interactive syllabus [18, 25].

3. The Case Study of the START Syllabus

3.1. Producing an Interactive Syllabus

In implementing the interactive syllabus, learners were enabled to provide their feedback about the course content, as well as enabling them to access useful resources using digital links [32]. The videos were also used to provide information about each module of the training [32]. The interactive syllabus has also quizzes that help enhance motivation and reduce anxiety and learners can also complete a survey at the end of the syllabus [33]. Moreover, in designing the interactive syllabus online, learners and website visitors were invited to rate and comment on the interactive syllabus. The website visitors are likely to be those interested in the START e-business training, and they can be future trainees. In developing the interactive syllabus, the ADDIE model (Analyse, Design, Develop, Implement, and Evaluate) [34] was followed side-by-side when developing the START training. It is suggested that syllabi should be reviewed to ensure they are student-centered [35].

3.1.1. Analysing Learners' Needs

Arabic-speaking trainees are of different backgrounds, including age and education, and therefore their readability levels are unknown. However, they all share the same interest in running an online business. Therefore, the training itself has authentic learning objectives. Learners are distributed across Australia, and hence it was decided that it is best to offer the training online and self-paced, to accommodate their unknown daily schedules. Additionally, this approach ensures that learners can access the training materials at their convenience, promoting greater flexibility and engagement. By utilizing online resources, the training can also incorporate diverse multimedia tools to enhance learning experiences tailored to varying proficiency levels.

3.1.2. Designing the Contents and Visual Aspects of the Syllabus

The learning objectives of each module were outlined for the START online version, to cover ICT/computer, business and English skills development. Simplified and short versions of these objectives were prepared for the interactive syllabus. To increase the interactivity with the syllabus and hence increase the motivation to participate in the START training, quizzes were designed for each module. The aim of these quizzes is not to test the knowledge of potential trainees, but rather to help them be aware of their knowledge shortage if any and if they are interested and motivated, they can join the training. The visitors of the interactive syllabus website have the opportunity to rate the syllabus either via an online survey or by posting a review.

3.1.3. Developing and Crafting the Syllabus' Interactive Website

The interactive syllabus website was designed using software called Website X5. This software is featured with various templates, that consider accessibility compliance, including colour, font, and description for videos and images. The website is very simple and easy to navigate. The main page includes a video that provides an overview of the START training as well as a downloadable PDF version of the syllabus. There are four main buttons on each webpage (Figure 1).

Module 03 Building Business Plan

START e-Business Training
Module (03): Building Business Plan

Module 03 Building Business Plan

Module Training Objectives

- Understanding the importance of outlining a business plan.
- Writing a business plan using Microsoft Word.
- Writing template responses including offer templates.

Training Outcomes

Resources

Quiz

Download Syllabus << BACK to Module (02) NEXT to Module (04) >> START Registration

Your name: Your email:

Subject:

Message:

Check word:

Send

There are no reviews yet.

5 ★ ☐

4 ★ ☐

3 ★ ☐

2 ★ ☐

1 ★ ☐

Write a Review

Figure 1. A sample page from the START interactive syllabus.

Each webpage includes a video that describes one module of the training, the module objectives and the expected learning outcomes. These videos have animations, texts, images and shapes that were developed using Articulate 360 Storyline. The slides voice-over was prepared using Google text-to-speech, which reads transcripts that were prepared for each module. Some important resources were selected and provided to potential learners. Website visitors can answer the module's quiz, which opens for them when they click on the quiz link.

While the modules were developed using Articulate 360 Storyline which was uploaded to Chamilo LMS [36], the quizzes and survey were developed using iSpring QuizMaker and they were hosted on a Linux web server [37].

This START e-Business Training's Interactive Syllabus is available at <http://istartproject.net/syllabus/>. The site's design ensures that learners have a seamless and engaging experience. Additionally, the accessibility features incorporated into the website aim to make it usable for individuals with varying needs. This comprehensive approach reflects a commitment to inclusive and effective digital education.

3.1.4. Implementing the Training

After an Arabic-speaking resident expresses their interest in participating in START training, a welcome email is sent to them, including access details (username and password) to START Chamilo LMS. In the welcome email, there is a link to the online interactive syllabus as well as a PDF version of the syllabus (Supplementary Material). The first intake of START training began in January 2023. Participants are encouraged to familiarize themselves with the provided materials. Regular follow-up emails are sent to ensure participants remain engaged and supported throughout the training period.

3.1.5. Evaluating the Syllabus

The informal verbal feedback about the interactive syllabus was received from some peers who positively expressed that the interactive syllabus is light and easy to navigate. Moreover, there was a website visitor of the interactive syllabus called Kamal who left a 5-star rating and a comment saying: "The syllabus looks interesting. I look forward to join the training". These positive responses suggest that the syllabus effectively meets the needs of its audience. Future evaluations will focus on gathering more structured feedback to further enhance its usability and engagement.

3.2. A Printable Version of the Interactive Syllabus

As it was raised it is very crucial to have a printable version for an interactive syllabus [29], a printable version was designed for START e-business training. On the cover page of the printable syllabus, there is a QR code that redirects its reader to the website of the interactive syllabus. The printable version syllabus includes information about the START

e-business training as well as learning objectives and outcomes as well and some links to useful resources. Links to the module's online quizzes were provided. In the printable version of the syllabus, the contact information of the training tutor was provided. The printable version was developed using Microsoft PowerPoint to enable floating shapes, text-boxes and images, in a portrait layout. After designing the syllabus in PowerPoint, a PDF version was generated. As previous research suggested [4], the PDF syllabus has a simple presentation to enhance its readability. This printable format ensures that learners can access essential information even without an internet connection. The combination of offline printable syllabus and online interactive syllabus provides a comprehensive visualisation tool that caters to different preferences and needs.

To conclude this section, the implementation of the START e-Business Training followed the ADDIE model, which includes the Analysis, Design, Development, Implementation, and Evaluation phases. In the Analysis phase, the needs of Arabic-speaking learners were assessed to ensure the training was accessible and relevant. The Design phase focused on creating interactive elements that facilitate navigation and engagement. During the Development phase, multimedia components such as videos, quizzes, and interactive resources were integrated into the syllabus. The Implementation phase involved deploying the syllabus online, allowing learners to interact with the content at their own pace. Finally, the Evaluation phase included collecting informal feedback and user ratings to identify areas for improvement. Initial feedback indicated that the interactive syllabus was well received, with positive comments on its usability and engagement features.

The printable version of the interactive syllabus was also produced. This multi-step approach is to ensure that learners benefit from the training. Future iterations of the syllabus will incorporate more sophisticated analytics to track learner progress and outcomes.

4. Discussion

To conclude, this research shed light on a notable gap in the literature on the integration of interactive elements within syllabi using a design-based research approach. Designing

and developing START e-Business Training's interactive syllabus is subject to refinement, based on the analysis of feedback as part of design-based research. Interactive syllabi, which integrate multimedia elements and hyperlinked resources, have transformed traditional static documents into dynamic tools for learning [38]. Online learning, either blended or entirely online, requires a well-prepared instructional design, including the learning objectives, learning materials, activities, course content, multimedia, as well as syllabi. While the traditional paper syllabus has its significance to learners [20], the interactive syllabus motivates learners not only to revisit the interactive syllabus but also to engage with course content and activities, the START e-business training has its interactive syllabus not only features videos and links to useful resources, but also quizzes, rate and comment, and survey, as well as a printable PDF syllabus.

The present paper describes how both the interactive syllabus website and printable PDF version were designed and developed. While the interactive syllabus is more engaging and multimedia-rich, the PDF syllabus could be attached to emails, uploaded to the Chamilo LMS or downloaded from the interactive syllabus website. The START e-business syllabus, whether the interactive website or printable PDF file, is designed after assessing learners' needs, as a first stage in the ADDIE model. Learning objectives, links to useful resources and quizzes were prepared to meet learners' needs.

There were some challenges when developing the interactive syllabus, mainly the large amount of time required to develop the videos using multiple software for the transcripts, animations and audios, which then were uploaded and hosted on YouTube servers, and embedded in the module webpages. Other challenges included designing and developing the quizzes, which covered the module learning objectives. Both the interactive syllabus website and printable syllabus PDF have an appealing appearance.

Both START interactive and printable syllabi can be used independently. There are some unique features for the interactive syllabus, over the word/PDF document, as presented in Table 1 below. Additionally, the interactive syllabus allows for real-time updates and provides a more engaging and interactive learning experience. These features cater to different learning styles and preferences, enhancing overall student engagement and comprehension.

Table 1. Comparison between Interactive Syllabus and Printable Syllabus.

Factor	Interactive Syllabus	Printable Syllabus
Production	Website Pages using WebsiteX5	Syllabus Document using PowerPoint to PDF
Videos	Articulate Storyline to mp4	Not applicable. Replaced by Text instead.
Audios	Google Text-to-Speech	Not applicable. Replaced by Text instead.
Surveys	Online surveys developed using iSpring Quizmaker	Links to online surveys provided

Factor	Interactive Syllabus	Printable Syllabus
Quizzes	Online quizzes developed using iSpring Quizmaker	Links to online quizzes provided
Comment & Rating	Online, using WebsiteX5 Object for Comment & Rating	Not applicable
Buttons	Available on the website, developed using WebsiteX5 object for buttons	Not applicable. Learners can flip PDF syllabus.
Flip & Download	WebsiteX5 Object	Not applicable
QR Code	QR Code Generator (embedded)	QR Code Generator (embedded)
Links to Resources	Clickable	URLs provided
Availability	Online, and requires ongoing internet access. It cannot be attached to emails.	Offline, and no need for ongoing internet access. It can be attached to emails.

The START e-business training, and of course its syllabus, are designed using design-based research [39], which means that after each intake, the learners' evaluation is analysed to refine the training modules and the syllabus. This requires much effort, with each intake/iteration. This paper is practice-based rather than a research paper, as it describes the process of designing the interactive syllabus website and the printable syllabus PDF from an educational designer's perspective. In the future, and after the results of the survey are received and analysed, a report of the findings can be discussed. Having said that, the primary feedback received informally was positive which was supported by the only rating and comment that was left on the syllabus website by the time this paper was submitted. The continuous refinement and iteration process aims to enhance the learning experience and ensure the training remains relevant and effective. Future research will focus on more detailed feedback analysis to further improve the program's impact and reach. Moreover, the insights gained from this iterative process can inform best practices for designing similar educational programs. Emphasising user-centered design principles, this approach highlights the importance of adaptability and responsiveness in educational development.

5. Conclusion

In general, and to conclude, when the interactive syllabus is multimedia-rich and aligned with constructivist course objectives [19], it offers learners a pedagogically rich website for the training materials that form the basis for participating in the training.

While the interactive syllabus can be implemented into the Chamilo learning management system for the training, it is wise to be separate from the LMS as potential learners will not be able to join the START e-business training without expressing an interest to enrol in the training.

The interactive syllabus has a number of special advantages, including its ability to simplify complex concepts and relationships, which helps cause better retention and communication than text across cultural and language barriers [24].

Moreover, the interactive syllabus has the capacity to engage learners with different learning styles, and also different readability levels, as those participating in the training are from different age ranges and educational levels [24].

Overall, this paper made some contributions to knowledge and practice, including assessing features of traditional versus interactive syllabi and describing the steps, processes and tools that are used to design and develop the interactive syllabus, and how to produce a corresponding printable PDF version of the interactive syllabus. Effective online learning, whether blended or entirely online, necessitates a well-prepared instructional design encompassing learning objectives, materials, activities, course content, multimedia, and syllabi. Although there is an increasing trend in gamification in education, and consequently the use of gamified syllabi [40], this paper has not focused on such a trend in education. The interactive syllabus for the START e-Business Training not only motivates learners to revisit the syllabus but also encourages deeper engagement with course content and activities. While traditional syllabi hold significance, interactive syllabi offer multimedia elements and interactive features such as videos, quizzes, and feedback mechanisms [20].

This paper provides a comprehensive overview of the design and development process, emphasizing the importance of iterative evaluation and feedback. Future research should focus on empirical evaluation of the syllabus to further refine its design and enhance its effectiveness in promoting learner engagement and motivation. The potential for scalability and adaptability of the interactive syllabus across various educational contexts also warrants further investigation. Additionally, exploring the impact of interactive syllabi on long-term learning outcomes could provide valuable insights into their effectiveness and broader educational implications.

Abbreviations

START Smart Training for Arabic-Speaking Residents on Technology

DBR Design-Based Research
 ADDIE Analyse, Design, Develop, Implement and Evaluate

Supplementary Material

The supplementary material can be accessed at
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Author Contributions

Amelie Hanna: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing

Lindsey Conner: Conceptualization, Supervision, Writing – review & editing

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Conflicts of Interest

The authors declare no conflicts of interest.

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Biography



Amelie Hanna has 25 years of Academic & Professional Experience in Public & Business Administration and Information & Education Technology. During her various postgraduate studies, Amelie has taught different subjects in different schools and university departments. In her first PhD, Amelie was one of the top five PhD Researchers at the University of South Australia. Amelie has published a number of journal articles in international academic journals and presented a number of research papers at national and international conferences. Amelie has received a number of awards during her professional & academic lives. Along with being a Website & e-Learning Designer, Amelie is currently doing her second PhD at Flinders University, and working on teaching Arabic-speaking migrants to Australia to establish their e-businesses, through START e-Business Training she designed and developed using Design-Based Research. For more information: <https://researchnow.flinders.edu.au/en/persons/amelie-hanna>



Lindsey Conner is currently the Education Director, Asia Pacific for Cognition Education. She has over 35 years' experience in NZ and Australia as a secondary teacher, teacher educator, reviewer, evaluator, researcher, project and staff manager and thought leader. She uses agile processes in working situations that require adaptability or transforming teaching and learning via judicious use of digital technology. Her creative and innovative mindset is infectious so that teams she has led, have sustained open-minded viewpoints that take account of the most effective approaches, biculturalism, diversity, and inclusion. Her previous roles have included being Deputy Pro Vice Chancellor at the University of Canterbury, Dean of the College of Education, Psychology and Social Work at Flinders University and Professor of Digital Education and Innovation. She has over 188 research outputs. For more information: <https://www.flinders.edu.au/people/lindsey.conner>