

Explore the Role of Segmentation in the Design of Learning Courseware

Mazin Al-Asadi*, Irfan Nofal Bin Umar

Center for Instructional Technology and Multimedia, Universiti Sains Malaysia, Malaysia

Abstract The importance of segmenting learning context has proven to effect learner's ability by enabling them to memorize and retrieve clues related to their learning context. Few studies addressed the role of segmentation in learning. Therefore, this paper is aimed to introduce the potential of segmentation in courseware learning. A number of recommendations extracted from previous studies are also reported in this paper.

Keywords Learning design, Segmentation, Learning principles

1. Introduction

Providing effective learning materials do not necessarily reflects learners' preferences, this include the current settings provided in e-learning (also referred to as Web-based education and e-teaching) which defined as a context for education where a large amount of information and services describe the teaching-learning continuum [1]. This kind of service obtains a better representation of information based on deploying different learning tools and techniques for certain purposes, which could be seen as a blessing: plenty of information readily available just a click away [2].

Even so, it could equally be seen as an exponentially growing nightmare, in which unstructured information chokes the educational system without providing any articulate knowledge. An example of these integrations is data mining, which was used to simplify the existing problems with e-learning [3], which can be understood not just as a collection of data, but also as a data analysis that encompasses anything from the contents of data, and the pre-processing and modelling of these contents [4].

The digital content for e-learning is huge, and retrieving this content normally results in a random list output that can be daunting, meaningless, and not efficient for learning purposes [5]. Each item on the list consists of a vague description of the document with the keywords entered for the search matched in various combinations.

Clicking on the item would invoke a download or full display of the document which could be one page or hundreds of pages long. These facts reflect the current lack

of pedagogical preparation to provide an efficient representation that helps ensure meaningful use of or access to the documents in the courseware systems. Thus, there is a need to employ technologies for designing more suitable presentations of the learning contents and documents.

Segmenting learning content has been recognized as an important issue and systems can be personalized for different knowledge displays. Also, representing learning contexts in several ways and styles, based on the pedagogical design of the learning environment, can provide quick and accurate additional information for those interested in details [6].

The knowledge representation of content in the courseware and related learning applications has been categorized into various formats in a different number of educational environments. Segmenting knowledge can be found in different forms, which seek to reside, as a conceptual stage, in the head of the person using e-learning resources. This kind of knowledge contains several forms (both tacit and explicit) that most learners understand. Another type presents knowledge as information, which represented in a mode of speaking in the form of documents [7].

The adoption of segmentation of knowledge in the academic fields alters the impressions of educators and learners and allows them to perform their tasks meaningfully.

Nowadays, lecturers — rather than lecturing — are trying to be instructors who assist and orient the learners into the learning process [8]. On the other hand, learners are likely to be motivated as they practice with different valid and structured representations of information. Hence, applying or designing certain knowledge strategies into current online courseware design may help to increase the learner's performance. Furthermore, it is important to comprehend the substantial impact that technology has on education [9].

Knowledge providers and current educational

* Corresponding author:

mazenabedstar@yahoo.com (Mazin Al-Asadi)

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environments such as Google and Yahoo are segmented on the web but they only offer data and pieces of information in the form of explicit knowledge. The user searches repetitively through the databases or content of these environments to gather pieces or parts of knowledge and then assembles them together into meaningful sets. No effort has been conducted to present the content in a meaningful or holistic way in the form that offers tacit knowledge and allows the user to see the knowledge in an organized or schematic form that would enable the user to capture and generate new understanding and quickly consolidate them into a bigger or more dynamic schemas and structures.

The presentation of courseware content in a meaningful or holistic way in the form that offers tacit knowledge requires pedagogical design. Design based segmentation can help to provide the structuring of experience or contents that mostly intends to describe and understand the different kind of knowledge for obtaining a reliable practice in a technology enhanced learning environment. It involves the use of high-order patterns in presenting knowledge contents by employing strategies such as structuring, ordering, chunking, and customizing. One application of pedagogical design is to extract the structure of practicing knowledge into a meaningful form that can be easily presented and is constructive in developing deeper understanding. A good design offers information in an articulate, segmented, and customized form to match learner needs and research knowledge representation.

No study has investigated the suitability of a pedagogical design that promotes the acquisition of tacit knowledge within the courseware settings. So this study is conducted to address current practices in segmenting courseware content.

2. Segmentation Design

Segmentation is a pedagogical aspect in which the design is related to the proper use of strategies. However, pedagogical designs are high-order patterns that are known in many domains of education and teaching such as group work, software design, human computer interaction, education and others. The main idea is an extension of pattern expressions. Segmentation based pedagogical design aims at adopting and executing the best customs of teaching [10].

The intent of segment design into the learning content is to extract the method of practicing knowledge in a short form that can be easily presented to those who need it [11]. Offering this information in an articulate and friendly form that is continuous between learning requires relearning of what is recognised in relation to knowledge of teaching within the community [12].

More than that, in designing and developing certain courseware content, the utilisation of segment patterns is still increasing, especially in the e-learning field. Whereas developers of these applications apply pedagogical patterns in a conventional manner, the learning community is still far

from employing segment design in the development of a proper courseware layout for learning. Ryberg and others has made an attempt to characterise pedagogical meaning in terms of design patterns [13]. In listing good education and training practices through pedagogical designs, they recommend nine characteristics related to putting a proper pedagogical design on record for a clear representation.

Preceel, et al. [14] argued that most academic online learning is perceived as complementary to lecture-based courses, and therefore employ pedagogical approaches that are adopted from the traditional, frontal teaching and learning process. Consequently, online courses and materials do not usually employ pedagogical approaches that fit online learning. As a result, students' achievements when reading digital text are reported to be lower than their achievements when reading printed text [15]. Reading academic text in a digital format is problematic for most learners because of disorientation problems and the low level of ownership that readers have in digital text.

The Department of Continuing Education and Outreach of Rutgers University offered a layout based checklist to describe some of the characteristics or components considered to be essential to "good" online lesson course construction. The web pages are to:

- include a welcome statement on the Home Page.
- provide a brief text on lesson or course overview / introducing statement.
- provide an introduction, an overview and/or objectives.
- provide an image(s) to create a visually inviting environment.
- give clear instructions for navigating through the Unit and participating in it.
- include presentation and course materials that concisely convey the key points about the topic of the lesson Unit.
- chunk all Unit content into "digestible" segments for easier onscreen reading and comprehension, and
- provide relevant images (e.g. photos, diagrams, graphs, charts, maps) to illustrate concepts and to create a visually engaging environment.

Courseware materials as currently available do not take into account the major elements of pedagogical design such as conveying precise search results, offering key points concisely, and chunking the content into digestible segments for easy onscreen reading. Chinn and Brewer [16] addressed the potential for organizing or integrating information meaningfully into a schema or cognitive framework. According to them, the human mind follows logical rules in organizing the information and ideas it receives, and sorts and arranges them in an orderly fashion in into the learner's cognitive structure. They argues that an efficient cognitive structure is hierarchically organized, that is, highly inclusive or general concepts form at the top of the knowledge hierarchy with less inclusive sub concepts and informational data subsumed below them. Creating the proper categories and arranging them into a hierarchical structure allows the

learners to retain and recall a specific set of knowledge more efficiently. Having a cognitive structure that is clear and well organized facilitates the learner to absorb new information without much effort and in a shorter time.

Chinn and Brewer propose the use of major or super-ordinate concepts to act as anchoring posts for the new information to be meaningfully acquired. This led us to conclude that providing effective segmenting principles can help favour learners learning.

3. Conclusions

This paper introduced the main aspects associated with the design of courseware, the pedagogical view, and the customization of current learning materials. The understanding resulted from reviewing different design recommendations led us to conclude the importance of design segmentation in learning based context. This includes applying it to facilitate learners learning performance. Therefore, more studies are needed to determine the effectiveness of segmentation principles into the design of learning content in general and courseware design in particular.

REFERENCES

- [1] E. T. Welsh, C. R. Wanberg, K. G. Brown, and M. J. Simmering, "E learning: emerging uses, empirical results and future directions," *International Journal of Training and Development*, vol. 7, pp. 245-258, 2003.
- [2] T. Tang and G. McCalla, "Smart recommendation for an evolving e-learning system," *International Journal on E-learning*, vol. 4, pp. 105-129, 2005.
- [3] M. Dredze, J. Blitzer, P. Talukdar, K. Ganchev, J. Graca, and F. Pereira, "Frustratingly hard domain adaptation for dependency parsing," in *CoNLL Shared Task Session of EMNLP-CoNLL*, 2007, pp. 1051-1055.
- [4] J. Imitola, K. Raddassi, K. Park, F. Mueller, M. Nieto, Y. Teng, *et al.*, "Directed migration of neural stem cells to sites of CNS injury by the stromal cell-derived factor 1 /CXCL12 chemokine receptor 4 pathway," *Proceedings of the National Academy of Sciences of the United States of America*, vol. 101, p. 18117, 2004.
- [5] J. Roca, C. Chiu, and F. Martinez, "Understanding e-learning continuance intention: An extension of the Technology Acceptance Model," *International Journal of Human-Computer Studies*, vol. 64, pp. 683-696, 2006.
- [6] F. Coffield, D. Moseley, E. Hall, and K. Ecclestone, *Learning styles and pedagogy in post-16 learning: A systematic and critical review*: National Centre for Vocational Education Research (NCVER), 2009.
- [7] N. Ferrer and J. Alonso, *Content Management for E-Learning*: Springer Verlag, 2010.
- [8] D. Dolk and B. Konsynski, "Knowledge representation for model management systems," *Software Engineering, IEEE Transactions on*, pp. 619-628, 2009.
- [9] R. Clark and R. Mayer, *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*: Pfeiffer & Co, 2007.
- [10] L. Kolås and A. Staube, "Implementing delivery methods by using pedagogical design patterns," 2004, p. 5304-5309.
- [11] J. Bergin, Jutta, E., Mary, M., & Eugene, M., "Fourteen pedagogical patterns," in *Fifth European Conference on Pattern Languages of Programs*, NW, US, 2001.
- [12] W. Jochems, J. van Merriënboer, and R. Koper, *Integrated e-learning: Implications for pedagogy, technology and organization*: Routledge, 2004.
- [13] T. Ryberg, C. Niemczik, and E. Brenstein, "Methopedia-Pedagogical Design Community for European Educators," in *The Proceedings of the 8th European Conference on e-Learning*, Academic Publishing Limited, 2009, pp. 503-511.
- [14] K. Precel, Y. Eshet-Alkalai, and Y. Alberton, "Pedagogical and design aspects of a blended learning course," *The International Review of Research in Open and Distributed Learning*, vol. 10, 2009.
- [15] R. Ackerman and M. Goldsmith, "Control over grain size in memory reporting--With and without satisficing knowledge," *Journal of Experimental Psychology: Learning, Memory, and Cognition*, vol. 34, p. 1224, 2008.
- [16] C. A. Chinn and W. F. Brewer, "The role of anomalous data in knowledge acquisition: A theoretical framework and implications for science instruction," *Review of educational research*, vol. 63, pp. 1-49, 1993.