Learning About the Learner:
Deducing Learner Characteristics From Their Interaction with e-Learning Tools

Ingrid Talbot

Faculty of Education,
University of Malta

1   Introduction

The study seeks to explore how e-learning is tackled by learners and thus investigate how hypermedia tools help to identify specific learner characteristics. Such characteristics can be detected by means of assessing the manner in which adult learners perform in a number of given e-learning tools. The different navigating and learning strategies of individual learners will be observed. In this way a knowledge acquisition strategic pattern can be established.

Unlike other traditional teaching and learning tools, where much of this information tends to be lost within the pedagogical process, e-learning can thus be seen under the light of its potential to acquire knowledge of every learner on an individual basis. Such an asset gives the possibility to collect information about the learner not only in the traditional manner of assessments, but also through:

1. through the way the users interacts with the e-learning tool facilities;
2. through the order in which the user navigated through the material presented by the tool.

Hence, the uniqueness of hypermedia lies in the fact that it recognises that people learn in different but interwoven ways.

2   Related Work

The research area in question mainly involves the effects of cognitive styles on hypermedia navigation. In spite of the fact that there has been an increased use of hypermedia to deliver teaching and learning material, there still remains much to be explored and learnt about how different learners perceive such systems.

Most research in this area deal with non-linear and linear learning, field-dependent and field-independent learners, learner control, navigation in hyperspace and learning effectiveness. Chen and Macredie mention the uniqueness of hypermedia in that:

there is no one linear path through the program but a multitude of branches in which a learner can explore a subject matter at his/her own pace. [3]

Ayersman and Minden reinforce this concept by suggesting that *hypermedia has the capacity to accommodate individual learning style differences.* [1]

Messick in turn speaks of the importance of acknowledging cognitive styles as a unique characteristic of each and every learner. And it is for this reason that the development of hypermedia-based learning has an important role in terms of these learning patterns which are indications of:

the users processing habits, the users typical modes of perceiving, thinking, remembering and problem solving. (Messick in [3])

Ford and Chen mention that among the various dimensions in the research area concerning cognitive styles, Field-Dependence and Field-Independence has emerged as one of the most widely studied having a wide applicability to education.

The following outlines the differences between Field-Dependent and Field-Independent Learners

Field-Dependant learners:

- They find it difficult to restructure new information and forge links with prior knowledge
- Their personalities show a greater social orientation
- They experience surroundings in a relatively global fashion, passively conforming to the influence of the prevailing field or context
- They demonstrate fewer proportional reasoning skills
- They prefer working in groups - They struggle with individual elements
- They are externally directed
- They are influenced by salient features
- They accept ideas as presented

Field-Independent learners:

- They are able to reorganize information to provide a context for prior knowledge
- They are influenced by social reinforcement
- They experience surroundings analytically, with objects experienced as being discrete from their backgrounds
- They demonstrate greater proportional reasoning skills
- They prefer working alone
- They are good with problems that require taking elements out of their whole context
- They are internally directed - They are individualistic
- They accept ideas strengthened through analysis

Adapted from [24, 16, 19]

Hypermedia tends to present learning in a non-linear format. This implies that Field-Independent students are relatively capable of setting the learning paths by themselves in hypermedia programs with non linear presentation. On the other hand, field-Dependent students seem to prefer to have a fixed path to follow in linear learning programs.

Hence a new challenge is raised in view of the fact that adult learning, particularly technology-enhanced learning, is still in its development stages. Delving into new content areas themselves, in most circumstances is the way to acquire more knowledge in this field. As we grow in our understanding about what it takes to teach adults effectively, we are seeing distinct patterns in how adults tend to learn. Although it is difficult to outline all of these learning styles since learning is inherently a personal quest, and therefore, individuals may have diverse learning patterns, one can still attempt to identify some of the most common and critical patterns to know prior to developing adult learning opportunities.

In discovering these patterns, one can identify learning strategies referring to methods that adult students use to learn by means of accommodating the differences in personal and situational characteristics of every student. Thus,

1. Adult learning programs should capitalise on the experience of participants.
2. Adult learning programs should adapt to the aging limitations of the participants.
3. Adults should be challenged to move to increasingly advanced stages of personal development.
4. Adults should have as much choice as possible in the availability and organisation of learning programs.

Ultimately learning can and should be a lifelong process. It should not be defined by what happened early in life, only at school since learners constantly make sense of their experiences and consistently search for meaning. In essence, learners continue to learn. For this reason, the age factor plays a very important role and in this regard, it is necessary to make a clear distinction between young and adult learners and thus the implication of maturity on the notion of lifelong learning. Age will be considered in the light of the way it influences learning and the style adopted for knowledge acquisition. Thanks to individual learning processes, learning environments and learners themselves can be re-created. Adult education can truly act as a catalyst for change in peoples lives, strengthening self-confidence and sparking higher goals in learning, work, and life.

3   The Proposed Project

3.1   Overview

Various traits of the user can be deduced through the pattern he or she uses whilst navigating and getting hands-on experience of the subject content contained within an e-learning tool. Through the analysis of the use of these tools, information about the user can be deduced and such observations will be subsequently used to improve the learning experience for the user.

The background to the following dissertation will be an exploration of three main branches namely:

1. learning styles
2. age learning issues and
3. experience with a particular electronic learning environment

All of the above three elements, although in an independent manner, will help to create a better picture, thus giving a valid evaluation of the user. In turn, this will facilitate the adoption of the right teaching and learning methodology.

This three-fold approach will thus focus on the main characteristics of the adult learner. It is interesting to note that the above-mentioned are independent variables. This implies that even though all of them will help create a clearer learners profile, they are not mutually dependent. The learners experience, age and learning style all provide feedback which will serve as input to the observational and analytical stage of the project.

3.2   Analysis

The analytical phase of the project will have two main facets. These two distinct components will be that of:

1. Discovering which learning strategies the user makes use of in order to gather the necessary information from the e-learning tool, throughout the navigation process.

2. Determining to what extent has the learning of the actual content within the e-learning tool has been effective

The term tool familiarity refers to the learners experience to find his or her way through in a particular e-learning environment. One cannot but recognise that the user interface may be quite complex. Thus, for the sake of the feature which is being explored, it is important not to confuse learning navigation with the tool with the actual subject being taught.

Through the exploration of adults of different age groups, the age factor of adult learners will be explored together with its relevance on the learning pattern of the individual.

The effectiveness of e-learning tools will be measured through a form of assessment. In comparison to traditional pedagogy, the usefulness of such an approach is that it can be varied in such a way so as to accommodate the learning needs and specifications of the individual learner.

An additional advantage of e-learning is that it puts the learner as the focal point of the whole process. The student is given the freedom to choose from a variety of patterns through which knowledge can be acquired and mastered. A field to be explored will be in fact that of verifying whether a particular age can be identified with particular learning patterns or whether these learning styles vary unconnectedly. A connected issue will be that of seeing to what extent one could possibly deduce the learning style of a student simply by observing the pattern used when navigating the information which is presented within the learning tool.

The great potential of hypermedia is that ultimately it provides non-linear learning and gives the user legroom for experiential learning. Another aspect to be considered is the manner in which information is presented and made accessible within these media, thus it enhances constant user interaction. An additional strength attributed to hypermedia is that it can be reconfigured according to the style adopted during the navigation. All this takes place exclusive of the users awareness of the ongoing process. All this happens on the fly since the presence of a machine in the background coordinates this activity. However, the effectiveness of hypermedia still has vast areas which are still to be explored.

3.3   Deductions: Aims of the Project

Since different learners profiles would have been created subsequent to the analysis stage of the project, the following proposals will be put forward as part of the study:

1. Learning tools should be built whilst keeping in mind the age factor of the typical learner since this is highly influential on the way people learn and will in turn impinge on the presentation style of prospective such tools.
2. Learning tools can be reconfigured dynamically since as the learner interacts with the user interface, the machine which lies in the background learns about the learner and shapes the different knowledge presentation components of the learning tool.
3. E-learning tools provide easy access to information about how the learner navigates through the new information. By analysing the users logs, one can obtain useful information about the knowledge content being explored and the areas which the user finds particularly difficult. This in turn will act as an aid to syllabi reformation so as to boost learning efficiency.

3.4   Practical Applications of Results

Access has been given to a number of commercial e-learning tools whereby the researchs findings can be applied.

1. Avicenna is a UNESCO led European Commission funded project aiming to accelerate the adoption of Open Distance Learning in the Euro-Mediterranean region with partners come from fifteen Mediterranean countries. The goal of the project is to create a virtual campus, through the training of people from the participating institutions and funding of development of e-learning units by these institutions.
2. A company which is currently involved in various project within the local context is Seasus New Media whose services includes integrated web solutions and distance learning. The company will give access to its tools, including those still in the pipeline, for the sake of analysis in the study.

4   Conclusion

This research area clearly indicates the significance of lifelong learning in our day. This term denotes the learners participation in any type of education or training course. This phenomenon encapsulates initial education, further education, continuing and further training, training within the company, apprenticeship, on-the-job training, seminars, evening classes and distance learning.

In this day and age Lifelong Learning is a very important issue since one cannot but keep up-to-date with the times. Malta has been described in light of its strong potential for Electronic Learning which is the key to future learning due to its increasing significance. The global diffusion of e-learning can be surely put to the avail of adult education.

The ultimate aim remains that of empowering the learning community and placing the learner at the very heart of his or her local commune. The ideal would be to map and track existing lifelong learning provisions, internally and externally; to analyse the current position, looking for strengths, weaknesses, gaps and overlaps thus creating a more joined-up approach to lifelong learning, with a constant focus upon the needs of end users, not the providers.

References

1. Ayersman, D.J. and Minden, A. (1995) *Individual differences, computers, and instruction,* Computers in Human Behavior 11(3/4)
2. Baptista Nunes, J.M. and Fowell, S.P. (1993) *Hypermedia as an experiential learning tool: a theoretical model,* [Online] `http://www.inforamtiononr.net/ir/2-1/paper12.html`.
3. Chen, S.Y. (2002) *A cognitive model for non-linear learning in hypermedia programmes,* British Journal of Information Technology, Vol 33 No 4.
4. Chen, S.Y. and Macredie, R.D. (2002) *Cognitive Styles and Hypermedia Navigation: Development of a Learning Model,* Journal of the American Society for Information Science and Technology, Vol 53 No 1
5. Durfresne, A. and Turcotte, S. (1997) *Cognitive style and its implications for navigation strategies* in Boulay, B. and Mizoguchi R. (eds) Artificial Intelligence in education knowledge and media learning system, Amsterdam IOS Press.
6. Ford, N. and Miller, D. (1996) *Gender differences in internet perceptions and use,* Aslib Proceedings, 48.

7. Ford, N., Wood, F., Miller,D., Sobczyk, G., and Duffin, R. (1996) *Information skills, searching behaviour, and cognitive styles for student-centred learning: A computer-assisted learning approach,* Journal of Information Science Vol 22.

8. Ford, N. and Chen, S.Y. (2000) *Individual Differences, Hypermedia Navigation, and Learning: An Empirical Study,* Journal of Educational Multimedia and Hypermedia, Vol 9, No 4

9. Ford. N. and Chen, S.Y. (2001) Mat*ching/mismatching revisited: an empirical study of learning and teaching styles,* British Journal of Information Technology, Vol 32 No 1.

10. Galbraith, M.W. (ed.) (1991) Fa*cilitating Adult Learning: A Transactional Process,* Krieger Publishing Co. USA

11. Galbraith, M.W. (ed.) (1991) Ad*ult Learning Methods,* Krieger Publishing Co. USA

12. Heller, R.S. (1990) T*he role of hypermedia in education: A look at the research issues*, Journal of Research on Computing in Education, Vol 22

13. Hölscher, I. and Strubel, G. (2000) We*b Search Behaviour of Internet experts and newbies,* Journal of Computer Networks Vol 33 No 1.

14. Johnston, C.A. (1998) *Let Me Learn,* Corwin Press Inc., UK.

15. Johnston, C. A. (2000) *A Personal Guide to the Implementation of the Let Me Learn Process,* K.G.M. Print Services, NJ.

16. Jonassen, D. H. and Grabowski, B. (1993) *Individual differences and instruction,* Allen and Bacon, NY.

17. Kim, K.S. (1997) *Effects of cognitive and problem-solving styles on information-seeking behaviour in the WWW: A case study,* `http://www.edb.utexas.edu/mmreserarch/Students07/Kim`.

18. Messick, S. (1976) *Individuality in learning,* Jossey-Bass, SF.

19. Morgan, H. (1997) *Cognitive styles and classroom learning,* Pragerger Publisher, CT

20. Pimentel, J.R. (1999) *Design of Net-Learning Systems based on Experiential Learning,* `http://www.aln.org/alnweb/journal/Vol3_issue2/pimentel.htm`.

21. Reed, W.M. and Oughton, J.M. (1997) *Computer experience and interval-based hypermedia navigation,* Journal of Research on Computing in Education, Vol 30.

22. Shahabi, C., Zarkesh, A.M., Adibi, J. and Shah, V., (1997) *Knowledge discovery from users web-page navigation.* In workshop on Research Issues in Data Engineering, Birminghan, England.

23. Shih,c. and Gamon, J. (1999) *Student learning styles, motivation, learning strategies and achievement in web-based courses,* `http://iccel.wfu.edu/publications/journals/jcel/jcel990305/ccshih.htm`.

24. Witkin, H.A., Moore, C.A., Gooenough, D.R. and Cox, P.W. (1977) *Field-dependent and field independent cognitive styles and their educational implications,* Review of Educational Research, 47.

25. Wlodkowski, R.J. (1985) *Enhancing Adult Motivation to Learn: A Guide to Improving Instruction and Increasing Learner Achievement,* Jossey-Bass Inc. USA.