DEVELOPMENT OF ARGUMENTATION SKILLS VIA LEARNING MANAGEMENT SYSTEMS

Bringing together Argumentation Support Tools and Learning Management Systems

Nikos Karousos[1], Spyros Papadakis[1], Michalis Xenos[1], Nikos Karacapilidis[2] and Manolis Tzagarakis[3]
[1] *Internal Assessment and Education Unit, Hellenic Open University, 26222, Patras, Greece*
[2] *IMIS Lab, MEAD, University of Patras, 26504, Patras, Greece*
[3] *Department of Economics, University of Patras, 26 504 Rio, Patras, Greece*

Keywords: Argumentation, Argumentation Support Tools, Learning Management Systems.

Abstract: This paper highlights the need for bringing together features and functionalities from both Argumentation Support Tools and Learning Management Systems (LMSs) in order to support the trainers in the construction and implementation of argumentation learning designs. In this context, it is also proposed that sharing learning designs across argumentation and critical thinking is one way to introduce different teaching and learning approaches that address this issue. The development and implementation of an Argumentation Learning Activity Tool (or the exploitation of an existing one) within an LMS will help to effectively address the problem of teaching argumentation skills.

1 INTRODUCTION

In tomorrow's learning and working environments, people will be more and more involved in tasks within multidisciplinary, multicultural and physically distributed teams. The participation in such tasks puts heavy demands on the individual, both in the cognitive and social realms. On the one hand, one must capitalize on informal reasoning (cognitive) skills, such as constructing and evaluating arguments. On the other hand, one must make use of social skills of collaboration. However, research indicates (Ian Beatty, 2004) that people are not prepared to exploit such cognitive and social soft skills, as practices, from primary school to university, very poorly address their acquisition.

A recently European Union (EU) study (PISA 2009) pointed out that although the EU learners are continuously supported with new educational methods, material and processes aiming at enhancing learning, the level of proficiency in reading and the overall learning skills remain in a not satisfactory degree. The major amount of the learners cannot perform tasks relative to location and organization of information. Therefore, the need of improvement of the learners' critical thinking in most of the EU countries is imperative.

The issue of critical thinking is strongly related to the development of argumentation skills, since the later is a crucial factor for the former. A lot of learners have not the ability to craft a balanced, reasoned, well-thought argument. They too often confuse argument with opinion – that is, they write papers that are subjective and self-oriented rather than objective and reader-based. They are sometime black and white thinkers, unable or unwilling to address the complexities of an issue. The competence to comprehend and follow arguments of a scientific nature is, we would contend, a crucial aspect of scientific literacy in its fundamental sense. Inferring meaning from science texts requires the ability to recognize the standard genres of science, their appropriate use and, in the case of argument, to evaluate the claims and evidence advanced. The construction of evidence-based arguments requires critical thinking and abstract reasoning. In particular, apart from knowledge building, collaborative argumentation may promote more complex and critical thinking (Wegerif et al., 1999) which is the base for EU policies in the field of formal education, no-formal education and informal learning.

Moreover, learning design for the Life Long

Karousos N., Papadakis S., Xenos M., Karacapilidis N. and Tzagarakis M..
DEVELOPMENT OF ARGUMENTATION SKILLS VIA LEARNING MANAGEMENT SYSTEMS - Bringing together Argumentation Support Tools and Learning Management Systems.
DOI: 10.5220/0003691304740477
In *Proceedings of the International Conference on Knowledge Engineering and Ontology Development* (KEOD-2011), pages 474-477
ISBN: 978-989-8425-80-5

Learning environment is a complex task, especially in light of the increasing diversity of the adult learners. Learning materials need to be designed to take advantage of different adult learner ability levels, learning approaches & media, and curriculum developed to support a huge variety of outcomes in argumentation. The quality of the learning experience is highly dependent on the teacher, and how they conduct the learning process. If we are to succeed in using technology to transform education, then we need the specialized tools and environments for learning design that will enable the teaching community to act in the most scholarly and professional way possible in pursuit of educational innovation (Laurillard, 2007).

Most of the existing Argumentation Support Tools have a high level of formality. Unfortunately when using these tools the focus often is shifting from learning of argumentation to understanding the tool. On the other hand, the Learning Management Systems (LMS) have been attempted to encourage a variety of learning activities involved in critical thinking but have been unable to adequately support efficiently the development of argumentation skills.

This paper highlights the need for bringing together features and functionality from both Argumentation Support Tools and LMSs in order to support the trainers in the construction and implementation of argumentation learning designs. In this context, it is also proposed that sharing learning designs across argumentation and critical thinking is one way to introduce different teaching and learning approaches that address this issue. The development and implementation of an Argumentation Learning Activity Tool (or the exploitation of an existing one) within an LMS will help to effectively address the problem of teaching argumentation.

2 SUPPORT FOR TEACHING ARGUMENTATION

2.1 Argumentation Support Tools

Existing approaches to support argumentation through ICT vary in terms of the problem dimension they principally address and the context they particularly target: One category, focuses on a meaningful representation of the related items and their interconnections in a collaborative environment while others pay more attention in the provided functionality for structuring and evaluating one or more arguments.

For instance QuestMap (Conklin et al., 2001) resembles to a ‘whiteboard’ where all messages, documents and reference material for a project, together with their relationships, are graphically displayed. Compendium (http://www.compendium institute.org) is a tool that supports dialogue mapping and conceptual modeling in a meeting scenario, and can be used to gather a semantic group memory. In the same context, Belvedere (Suthers et al., 1995) is used for constructing and reflecting on diagrams of one's ideas, such as evidence maps and concept maps.

Other approaches such as Sepia (Streitz et al., 1989) and QOC (MacLean et al. 1991) focus on the representation of knowledge.

In the context of argumentation theory, systems supporting the visualization of argumentation have played a considerable educational role by supporting the teaching of critical thinking and reasoning skills. For instance, Araucaria (http://araucaria.computing.dundee.ac.uk/doku.php) supports the contextual analysis of a written text and provides a tree view of the premises and conclusions. In the same line, ArguMed (http://www.ai.rug.nl/~verheij/aaa/) and Athena (Standard and Negotiation) (http://www.athenasoft.org) build on a formal argumentation approach to addresses the issues of argument mapping.

Considering the above systems when teaching argumentation, apart from the aforementioned functionalities, there are some useful observations from past researches that are worth mentioned: (a) visual representation of an argumentative dialog seems to be more efficient than text representation (Pinkwart et al., 2008); (b) structuring and evaluating an argument can be absolutely enhanced with the exploitation of such tools; (c) both collaborative argumentation and argumentative collaboration may also be supported in order to advance the argumentation skills of the learners (Scheuer et al., 2010) and (d) a wide set of such tools has already be used for both learning and e-learning purposes with satisfactory results (Scheuer et al., 2010).

However, the choice of using such tools for teaching argumentation is not always the optimal due to the following issues:

- Most of the well known Argumentation Support Tools are stand-alone applications that require installation for each learner. In addition these tools do not support collaborative work in a classroom and

consequently they lack provision of a complete set of functionalities.

- Furthermore, it has been pointed out (G. Rowe et al., 2006) that the complexity of such tools force learners to spend enough of their time not to participate in argumentation courses but to focus on how to use the argumentation tools.
- The supported language for both the Interface and the content of each tool plays a critical role in the exploitation of the provided functionalities. Unfortunately most of the provided argumentation tools do not support multilingualism.
- Finally, the context off the usage of such tools is always limited inside a particular scenario with the presence of a trainer or a mediator. Hence, the capability to include the particular learning process as a part of a complete learning design scenario is not provided.

In general, these tools are exploited out of the context of an LMS. Thus several issues related to time, efficiency and learning design flexibility are still open.

2.2 Argumentation through LMSs

Hall (2003) defines an LMS as: ”software that automates the administration of training events. All Learning Management Systems manage the log-in of registered users, manage course catalogs, record data from learners, and provide reports to management.”

Learning Management Systems can be used in different ways. However, a common idea behind LMS is that e-learning is organized and managed within an integrated system. Different tools are integrated in a single system which offers all necessary tools to run and manage an e-learning course. All learning activities and materials in a course are organized and managed by and within the system. LMS typically offers, file sharing, management of assignments, mind maps, wikis, discussion forums, chat, etc. Furthermore, an LMS should support a collaborative learning community, offering multiple modes of learning—from self-paced coursework to scheduled classes (live instruction in classroom settings or online) to group learning (online forums and chats).

Selecting a traditional Learning Management System (LMS) requires balancing learning and management. LMSs like Blackboard, Atutor, Moodle, Sakai and Desire2Learn offer their greatest value to the organization by providing a means to sequence content and create a manageable structure for instructors/administration staff.

Using Argumentation Support Tools represents a different approach to organization of e-learning than the utilization of an LMS. Using an LMS, an e-learning course is delivered through and takes place within an integrated system. Our research on the most widely used LMSs, pointed out that building a training course for the development of argumentation skills is not based on specific argumentation support components. Instead, each trainer tries to fulfill the specific argumentation tasks in the design of the course by using (or combining) one or more components that are not created for that purpose. For example components such as discussion forums, rating and voting tools, and mind maps are usually combined in order to support a formal argumentative discussion within a training course. This approach may partially satisfy both trainers and trainees, however it is obvious that it cannot support all kind of argumentation courses such as construction and evaluation of an argument and argument discovering as well. Furthermore, the results of an ongoing argumentation cannot be structured and represented visual and cannot be imported as initial input to a next training task.

2.3 Bringing Argumentation Support Tools and LMSs together

The study already done and presented in this chapter highlights a missing point between argumentation and learning management process in terms of the absence of a common means for design argumentation oriented courses within the scope of an LMS. Apart from an interesting development of a plug-in for importing and sharing Compendium maps in Moodle (http://compendium.open.ac.uk/institute/support/collab-compendium.html) and the approach of CICERO tool that is a wiki based argumentation support tool (http://cicero.uni-koblenz.de/wiki) the LMSs have not be augmented with argumentation functionality yet.

Thus, from one hand, traditional argumentation software approaches are no longer sufficient enough to support teaching of argumentation inside the scope of a learning management system while, from the other hand, trainers who uses LMSs cannot perform specific design tasks for development of argumentation skills within the context of the LMS.

The main target of our research is to make this point clear and to proceed to the design and the implementation of an argumentation support tool that operates as a component within an existing and

widely accepted LMS such as LAMs or Moodle.

Such approach will benefit from both points of view (argumentation support and learning design) and it will allow the dissemination of specialized knowledge combined with cooperative learning and learning in communities.

Towards this direction, there will be several critical steps related to the appropriate methodology that has to be followed: (a) Further investigation of trainers' needs through real scenarios of building and teaching argumentation courses via LMSs. Feedback of these scenarios will be valuable for both the design of tools specifications and integrated functionalities; (b) Development (or using an existing one) of an argumentation support tool as a component of an existing LMS. Both tool and LMS should be widely accepted, open source licensed and should also support multilingualism (c) Re-engage the trainers to build and teach the same courses with the integrated LMS and evaluate the feedback against the initial requirements. (d) Enhance the provided functionality with particular features derived from the evaluation.

3 CONCLUSIONS AND FUTURE WORK

The enhancement of an LMS with native argumentation capabilities remains an open issue towards the development of argumentation skills. This paper tries to obtain the benefits of specific purpose Argumentation Support Tools and encapsulate them within the context of an LMS in order to provide efficient capabilities for design and implement training scenarios for teaching argumentation.

The future work in our research is initially focused on the design of the specifications and on the integration of an argumentation tool in an LMS. However, we are aiming at the investigation of some interesting questions that may be addressed during our research: (a) what learning designs can be readily adopted by teaching argumentation & critical thinking as templates for best practice?; (b) what pedagogical issues emerge from the implementation of learning designs in argumentation & critical thinking context? and (c) how can identified barriers to educators' adoption, adaptation and reuse of learning designs for teaching argumentation & critical thinking be overcome?

REFERENCES

Beatty, I. D. (2004). "Transforming Student Learning with Classroom Communication Systems." *Educause Center for Applied Research* (ECAR) Research Bulletin ERB0403, Feb 3.

Conklin, J., Selvin, A. M., Buckingham Shum, S. and Sierhuis, M. (2001) "Facilitated hypertext for collective sense-making: 15 years on from gIBIS", *Proc. 12th ACM Conference on Hypertext and Hypermedia*, ACM Press, 2001, pp. 123-124.

G. Rowe, F. Macagno, C. Reed and D. Walton (2006), Araucaria as a tool for diagramming arguments in teaching and studying philsophy, Teach. Philos. 29 (2) (2006), pp. 111–124

Hall, B. (2003). New Technology Definitions, retrieved June 5, 2003 from http://www.brandonhall.com/public/glossary/index.htm

Laurillard, Diana (2007), Pedagogical forms for mobile learning: framing research questions, in: *Mobile learning - towards a research agenda*, pages 151--173, WLE Centre

MacLean, A., Young, R. M., Bellotti, V. and Moran, T. (1991) "Questions, options and criteria: Elements of design space analysis", *Human Computer Interaction*, vol. 6, no 3-4, 1991, pp. 210-250.

Pinkwart, N., Lynch, C., Ashley, K., and Aleven, V. (2008) "Reevaluating LARGO in the Classroom: Are Diagrams Better than Text for Teaching Argumentation Skills*?" In Proceedings of the 9th International Conference on Intelligent Tutoring Systems*. Montreal, June.

Pisa 2009.: "PISA 2009 Results: What Students Know and Can Do: Student Performance in Reading, Mathematics and Science (Volume I)" EOCD Publications ISBN: 9789264091443. Summarize at: http://www.oecd.org/dataoecd/31/28/46660259.pdf pp. 8

Scheuer, O., Loll, F., Pinkwart, N. & McLaren, B. M. (2010). Computer-supported argumentation: A review of the state of the art. *International Journal of Computer-Supported Collaborative Learning*. 5(1), 43-102.

Streitz, N., Hannemann, J. and Thuring, M. (1989) "From ideas and arguments to hyper-documents: Travelling through activity spaces", *Proc. Hypertext '89 Conference*, ACM Press, 1989, pp. 343-364.

Suthers, D., Weiner, A., Connelly, J. and Paolucci, M. (1995) "Belvedere: Engaging students in critical discussion of science and public policy issues", *Proc. 7th World Conference on Artificial Intelligence in Education*, 1995, pp. 266-273.

Wegerif, R., Mercer, N., & Dawes, L. (1999). From social interaction to individual reasoning: An empirical investigation of a possible socio-cultural model of cognitive development. *Learning and Instruction*, 9, 493–516.