

DEVELOPMENT OF ARGUMENTATION SKILLS VIA LEARNING MANAGEMENT SYSTEMS

Bringing Together Argumentation Support Tools and Learning Management Systems

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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 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. A recent research: "What Students Know and Can Do: Student performance in reading, mathematics and

science" (PISA 2009) concludes that the major amount of the learners in Organization for Economic Co-Operation and Development (OECD) can perform reading tasks at Level 2¹ (basic reading level) while the 57% of them can perform tasks at level 3 (advanced reading level – identification of information relationships etc.). Actions that performed in the context of critical thinking (level 5 – location and organization of information) can take place only by the 7.6% of total population. There are

¹ According to OECD levels varies from level 1b (lower to level 6 (highest – critical evaluation and comprehension) Available at: <http://www.oecd.org/dataoecd/31/28/46660259.pdf>

significant differences in learning outcomes, activities, teaching methods and assessment across the disciplines/subjects/European countries. These have an effect on student engagement, learning and retention (Scott, 2005). In this context 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 latter 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 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, but they have not any successful examples of their use in vocational education or in lifelong learning (John A. A. Sillincea, and Masoud H. Saeedi, 2000). When using these tools the focus often is shifting from learning of argumentation to understanding the tool

and for that reason the teaching was generally tool centered instead of learner centered. (Aldo de Moor, Mark Aakhus, 2003). 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, gIBIS (Conklin, J. and Begeman, M. 1989) argumentation structuring tool, initially developed for the capturing of a design process rationale. 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. It targets to capture the key issues and ideas during meetings and create a shared understanding in a knowledge team. CoPe_it (<http://copeit.cti.gr>) builds on concepts of incremental formalization and allows argumentative collaboration, Reasoning and decision support.

Compendium (<http://www.compendiuminstitute.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 Euclid (Smolensky et al. 1987), Sepia (Streitz et al. 1989) and QOC - Questions, Options and Criteria (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 (Reed, C.A. and Rowe, G.W.A., 2004) supports the contextual analysis of a written text and provides a tree view of the premises and conclusions. This software has been designed to handle advanced argumentation and theoretical concepts, which reflect stereotypical patterns of reasoning. In the same line, ArguMed (Verheij 2003), Reason!Able (van Gelder, T.J., 2002) and Athena (Standard and Negotiation) (<http://www.athenasoft.org>) build on a formal argumentation approach to address 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:

- The visual representation of an argumentative dialog seems to be more efficient than text representation (Pinkwart et al. 2008).
- Structuring and evaluating an argument – two critical processes while teaching argumentation – can be absolutely enhanced with the exploitation of such tools.
- Both collaborative argumentation and argumentative collaboration may also be supported in order to advance the argumentation skills of the learners (Scheuer et al. 2010)
- 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 since many issues and difficulties occur:

- 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. It is obvious that tools that do not support the native language of its users cannot be enough efficient when dealing with argumentation capabilities. Unfortunately most of the provided argumentation tools do not support multilingualism.
- Finally the context of 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. Learning management systems 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.

Numerous factors impact successful LMS implementation. Key stakeholders include: (a) administrators, (b) faculty, (c) IT and technical support, (d) learners, and (e) curriculum developers.

Different types of learning require different approaches. Bates and Poole (as cited in Sessums, 2006) listed six characteristics for determining appropriate selection of technology:

- a. Will selected technologies work in a variety of learning contexts?
- b. How does it impact strategic, institutional level and tactical, instructional level decisions?
- c. Do the selected technologies provide equal attention to educational and operational issues?
- d. Will it take into consideration the affect of different media and technologies enabling an appropriate mix for a given context?
- e. Are the selected technologies user-friendly, practical, and cost-effective?
- f. Will the selected technologies be quickly outdated, or will they be flexible and accommodate new developments?

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.

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 (<http://lamsfoundation.org/>) (Dalziel 2003) or Moodle (<http://moodle.org>).

Such approach will benefit from both points of view (argumentation support and learning design) and it will allow the sharing of common practices and scenarios for developing argumentation skills around the world as well.

3 AIMS AND CRITICAL ISSUES

Our research aims at the improvement of development of argumentation skills through the provision an innovative training design argumentation support tool for an LMS environment. The complex and adequately structured learning field of argumentation is expected to be connected to several LMS set-ups, which are effective tools in exploratory learning. This approach favours an innovative concept of training, learning and competence development in the field of argumentation taking care of 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.

- 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.
- 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.

- Re-engage the trainers to build and teach the same courses with the integrated LMS and evaluate the feedback against the initial requirements.
- Enhance the provided functionality with particular features derived from the evaluation.

The overall results are expected to be valuable for the tasks of design and teaching argumentation. Furthermore, and from a generic perspective, this approach may help to improve and upgrade competences and skills of both the learners and the training staff in the field of the development of argumentation skills and exchange experiences. It will also define, experiment, establish and promote a complete generic methodology (criteria, procedures and practical guidelines) for the utilization of the innovative design training tool in order to support the development of argumentation skills. Finally it may establish a thematic network of interested groups for constant exchange of experiences and practices in the particular aspect worldwide.

4 CONCLUSIONS AND FUTURE WORK

The Learning Management Systems are an easy-to-use e-learning solution that allows educators to build reusable learning activities (modules) and connect them to become an activity sequence. It allows teachers to create sequences of activities for learners supporting a variety of models of learning. By following the sequence, learners are given an environment that they can focus and learn new knowledge while collaborating with others, and teachers can track learner activities.

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:

- What learning designs can be readily adopted by teaching argumentation & critical thinking as templates for best practice?

- What pedagogical issues emerge from the implementation of learning designs in argumentation & critical thinking context?
- How can identified barriers to educators' adoption, adaptation and reuse of learning designs for teaching argumentation & critical thinking be overcome?

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