Cloud e-Learning: A New Challenge for Multi-Agent Systems

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Abstract. The developments of pedagogical models in e-learning together with the advances of learning technologies and cloud computing give us confidence to believe that the traditional e-learning will evolve into a process which will put the learner in the center of educational provision. This paper proposes that Cloud e-Learning, a new approach to e-learning, will open opportunities for learners, by allowing personalisation, enhancing self-motivation and collaboration. The learners should be able to choose what to learn, what sources to use, with and by whom, how and in what pace, what services and tools to use, how to be assessed, whether to get credits towards a degree etc. In such a dynamic environment, the need for Multi-Agents Systems is necessary. Actors in Cloud e-Learning would need automated facilitation in all services involved. We outline few indicative scenarios for Cloud E-Learning in which smart agents will act on behalf of the learners, teachers and institution in order to maximise the benefit of the proposed concept.

1 Introduction: From Traditional e-Learning to Cloud e-Learning

Recent advances in Information and Communication Technologies have provided the opportunity to enhance e-learning with new synchronous and asynchronous features to both students and instructors. Educational institutions that provide e-learning can now develop courses and programmes that utilise existing pedagogies and experiment with new ones. It is apparent that these developments have lately facilitated the accessibility of e-learning through a wide variety of MOOCs (Massive Open On-line Courses).

A typical e-learning course, whether it is open or private, consists of four main components. The pedagogy should determine a number of characteristics for this course, such as the way in which the learning outcomes will be met by delivery and assessment methods as well as the learning path and learning pace of the group. Pedagogy will in broad terms define the balance between instruction and self-learning, implying also the type and frequency of communication.
(synchronous or asynchronous) between teachers and learners. The content will include a variety of text and media deemed as appropriate to give opportunities to meet the learning outcomes. The technological infrastructure is the set of Learning Technologies tools used by the teachers and learners in order to facilitate knowledge transfer and skill acquisition, such as VLE, teleconferencing tools, wikis, file sharing, social interaction, support and feedback etc. Finally, the course administration is a set of regulations and processes as well as their monitoring under which students enrol, attend, progress, etc. Irrespective of any combination of the above, e-learning inherits some rigidities of traditional face to face learning. The restrictions that characterise both types of learning are:

- teachers apply predefined pedagogies,
- the selection of material is largely done and/or recommended by the teacher,
- the tools of the technological infrastructure are specified by the course provider (teacher or institution),
- regulations and processes are provider/institution specific.

The big contradiction in this situation is that the learner, who is the receiver of the process, should abide by what the course providers have agreed, with no or little involvement in the above. This seems the “rational thing to do” for groups of learners, especially when providers are tied by the general educational framework in which they belong. Thus, for instance, Universities need to follow certain quality assurance requirements in order to award credits for courses and eventually degrees. But even then, course providers have been criticised that they do not apply a learner-centered approach, taking into account the individual types and needs of each learner. In this respect, Cloud e-Learning can be considered as an advancement of e-Learning, taking into account that there exist courses in which learners can take the initiative to select:

- the way and pace in which they learn,
- the means through which knowledge and skills are acquired,
- the tools that they are going to use for learning,
- the people (teachers, facilitators, other learners with whom they wish to collaborate etc) and institutions involved in their learning.

An immediate reaction to the above could be rather conservative, given the authors own experience in traditional education. Admittedly, however, reservations that most educators had two decades ago did not prevent the evolution of e-learning courses, e.g. MOOCs, by respectable institutions which are available to masses of learners, even if this is currently done mostly without credits.

It is evident from the above that the proposed Cloud e-Learning is a complex venture that, despite all technical and pedagogical issues, allows for a certain amount of automation. It would be cumbersome if all the tasks are carried out manually on the responsibility of the learner. Facilitation is definitely required. The authors position is that Cloud e-Learning is fertile ground for Multi-Agent Systems which would be responsible for such facilitation.