HUBEDU: Human Behaviour in Digital Education

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Abstract—**HUBEDU aims to discuss computational models of human behavior and computational intelligence applied to Digital Education. This is a growing field of research concerned to bring interactive technology to teaching and learning in classroom. We seek to foment the discussion around new forms of automatic assessment, and models to understand the impact of social behavior in classrooms, learning context, and individual profile modeling upon learning performance. A basic premise of this track was to think of multidisciplinary investigating and proposing solutions to build an Ecosystem for Digital Education. We believe that the two presented contributions were able to achieve the essence of this track.**

***Keywords*–Human Behaviour Understanding, Computational Intelligence, Digital Education**

I. Challenges for Human Behavior Understanding in Digital Education

The dream of successfully applying technology in education is to empower teacher and learner through technology creating a culture of evidence and inquiry for continuous knowledge improvement. However, despite the latest advances in technology offer to transform teaching and learning in the traditional classroom environment there is a general concern around effectiveness of the current approaches [1] [2]. That is, there is no clear evidence that technology produces better educational outcomes such as improved assessment grades, higher graduation rates, or better preparedness [3]. Also, the current successful initiatives that apply technology to education are hard to replicate.

We call participants to build solutions that are aimed to analyze the impact of ICT technologies in education and outline solutions to apply mobile computing, computational intelligence, and smart environments to stimulate quality education.

The successful application of ICT in education must provide measurable results, enhance student engagement, and improve knowledge retention. The exploration focused on the traditional classroom model applying technological devices and incorporating methods of evidence-based learning and adaptive education are fundamental to effectively understand the human behavior in educational environments with the support of technology identify specific students learning characteristics.

The driving question is: how to best apply technology in digital education? This question is surrounded by explorations around:

- How to support teachers and learners by making the best use of technology in education?
- What are the advanced methods that can be applied to improve the education process?
- What are the economical and social challenges and how to mitigate them?

Betting on reference models of digital education technologies requires models and standards to: create content; deliver classes; monitor performance; and promote real-time adjustments of the education process. The development pillars encompass the following targets:

Methods of personalized content to support a simple implementation of personalization through recommender systems for content, and automatic adjustment of content variations aligned to learner and class behavior.

Continuous monitoring of learners and class activities to detects irregularities in real time, providing notifications, and supporting adjustment of learning activates when needed.

Methods for automated content adjustment that act as a contingency to maintain student engagement, thereby leading to increased participation and consequently, an increase in learning performance.

Provide an appealing user experience to enhance learners satisfaction and, thus, improves student engagement and knowledge retention.

Those targets are fundamental to define more than applications or generic frameworks, but an Ecosystem for Digital Education.

II. Think about the Ecosystem

Teaching with the support of educational technologies should not differ from traditional non-digital methods and support the three stages of learning (exposure, process and feedback). Usually, a teacher of mathematics preparing a class about trigonometry, will search for concepts such as sine, cosine or tangent at a school library, ask for word-of-mouth suggestions, on-line websites, or even reuse previous classes materials.

After the selection of educational contents, the teacher, based on experience gathered by years of student observation, should be able to organize the contents considering the average educational performance of students, and teach. The success of the class will be measured by assessment feedback, emotional responses, or, in the next students essay.

Monitoring a class to identify the students behaviors and provide personalization is the holy grail of teachers. It can use different kinds of educational contents, different personalization features, pedagogical practices and methods of evaluation. The essence remains the same, but the technology must be a support to this activity. The role of educational technology regards the design and adaptation of Components to support each Phase of this process, allowing a Feedback and Personalization Phase to support the teacher activities.

The challenges to accomplish such ecosystem reside in open architectures, metadata standards, communication protocols and policies regarding data privacy and security of students and teachers.

Assessing how well a student learn some topic, without explicitly testing for that in an exam. It is thus necessary to incorporate the metrics into a greater model of student learning, for instance a knowledge map, based upon which new content could be suggested in accordance with what the student already knows, how engaged he or she is, the learning style, and other extracted metrics to personalize each students learning experience. Alternatively, the metrics may be used to design specific interventions in the teachers activities, for instance, alerting him/her that the class engagement level is dropping. Nevertheless, such interventions must be designed together with educators to augment the teachers experience, and not disrupt his/her day-to-day work.

III. The HUBEDU track contributions

Stimulate big ideas, be creative, follow up what was misunderstood and make good connections is what ambivalent students desire to be prepared to interfere and to be far of current passers-by of a school.

With the support of intelligent apps and agent technology we may manage the challenges around Active Learning and Flipped Learning inception inside classrooms. We presented an alternative to allow new and surprising ways to aid teachers and students. Teachers can benefit by a data-oriented analysis of their students learning performance. Students can change their behavior, to find creative landscapes,to think about what is in the learning process and acquire new pieces of knowledge.

Fostering greater usage of assessment results we explored the challenges around students performance improvementsand engagement providing the amount and quality evidence to support a solid basis for action, in particular to automatically suggest and guide changes and shifts in teaching and learning on campuses that will aid later to attain higher levels of knowledge retention and student accomplishment.

Motivation, the desire to do things, is now a key for learning and teaching (social activities), and an ECP supported by an Ecosystem of educational technology is also in charge to stimulate those involved in education to be continually interested and committed (engaged) to a task, or to make an effort to attain a goal.There are difficulties in education(how people learn, observable outcomes, metrics of success), and an easy way out is always to experiment and try things out.

Contributions such as *To Estimate Students Viewpoint to Learning from Lecture/Self-Evaluation Texts* from Toshiro Minami, Yoko Ohura and Kensuke Baba contribute with this track by presenting analyzing what types of words and terms are used in the evaluation texts and investigate students viewpoints in learning with the general goal to support a more effective and efficient learning process of the students. Toward this goal, they have been investigating students attitudes to their class by analyzing the text of their overall evaluations by looking-back a series of lectures. They have found that their viewpoints affect a lot on the students performance. Students who have wider viewpoints get better examination scores than those who concentrate too much to what they are supposed to learn.

Contributions such as *Enhancing Learning Objects for Digital Education* from Tiago Thompsen Primo, contribute with this track by presenting a method to describe Learning Objects as Semantic Web compatible Ontologies. The proposed method divides the Ontologies among three layers. The first is composed by the knowledge domain, the second by the LOs and their relations, and the third is responsible for knowledge inference and reasoning. As study case, it is presented the Ontologies of LOM and OBAA metadata standards as part of the Layer One. The layer two is composed by the description of sample Learning Objects based on the properties and restrictions defines by the layer one ontologies. The layer three describes the knowledge inference axioms, which we defined as Application Profiles. Their current results can be resumed as a contribution to Ontology Engineering for Semantic Web applied to Digital Education.

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References

[1] M. d. Rosario, ICT in Education Policies and National Development. New York: Palgrave Macmillan US, 2012, pp. 17–38.

[2] A. Kirkwood and L. Price, "Technology-enhanced learning and teaching in higher education: What is "enhanced" and how do we know? A critical literature review," Learning, Media and Technology, vol. 39, no. 1, 2014, pp. 6–36.

[3] B. Bruns, D. Evans, and J. Luque, Achieving world-class education in Brazil: The next agenda. World Bank, 2012.