Games for Learning Algorithmic Thinking (GLAT) Project: The influence of personal and environmental factors on perceived usefulness and usage of the LePlanner - learning scenario design tool

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Preamble

GLAT Project

The Project GLAT – Games for Learning Algorithmic Thinking is an Erasmus Plus Programme of the European Union under the Key Action 2, which is Cooperation for innovation and the exchange of good practices. The action type of the project is" Strategic Partnership for school education" The main objective of the project is to introduce the integration of coding and algorithmic thinking into daily teaching through different subjects at the primary school level in Croatia.

Consequently, the project involves training selected teachers in different innovative teaching and learning methodologies that stimulates logical thinking and problem-solving skills; with or without technology. As Five (5) institutions (University of Rijeka, Rijeka, Croatia; Tallinn University, Tallinn, Estonia; University of Ljubljana, Ljubljana, Slovenia; Ss Cyril and Methodius University in Skopje, Macedonia; and South-West University Neofit Rilski. Blagoevgrad, Bulgaria) are engaged in the project, with the University of Rijeka being the project Centre and coordinating institution. At the end of the day, the expected project outcomes are to: a) Compile workshop syllabuses and materials to facilitate teacher training workshops, b) equip Teachers with skills to design and share learning scenarios that facilitates coding and critical thinking, and problem-solving skills. The Leplanner was introduced as a tool for designing learning scenarios.

The LePlanner

The LePlanner was designed by a doctoral student of School of Digital Technologies in the Tallinn University, Estonia. The tool offers the opportunity for designing learning scenarios, visualizing the scenarios and sharing them. It enables teachers to archive their teaching and learning martials perpetually and those materials could be reused with or without modification. LePlanner had been used in various projects to promote innovative teaching and learning (Pata, Beliaev, Robtsenkov, & Laanpere, 2017).

The Problem

Training students to be critical thinkers has become essential based on the demands and the need for developing new skills for the job market and social developments (Bacigalupo, Kampylis, Punie, & Van den Brande, 2016; Vuorikari, Punie, Carretero, & Van Den Brande,

2016). GLAT is an Erasmus funded institutional partnership project that seeks to prepare teachers with innovative teaching skills to achieve this feat. In line with the aims of the project, teachers have been drawn from schools in Croatia to undergo a training in innovative teaching and learning practices; covering topics such as Game-based learning approaches, developing learning scenarios, how to use multimedia tools and resources, Problem-based learning, Inquiry learning, and programming skills.

This study assumes that the subjects of the GLAT project are non-ICT related teachers and taking up new role as coding teachers and the pursuance of technology-driven lesson and use of online design tools might be challenging in the face of their digital disposition and age. Stakeholders on the GLAT project will not be able remedy teacher concerns unless they are known; therefore, among other studies this current research sought to elicit the possible challenges, needs and the digital endowments the teachers bring on board the project. Inputs from the teachers would enable the stakeholders in GLAT to use them to prepare them for the new professional roles as algorithmic thinking teachers. Hence, this article gives a report on the investigations done regarding the raised concerns.

Objective

The overall objective of this paper is to undertake a descriptive overview about the perceptions of the teachers participating in the project on a) digital self-efficacy, b) Digital ICT usage c) the digital supports in their schools, the perceived usefulness and the actual use of LePlanner – a new tool introduced; and further explore how the age of the teachers influence the perceptions. Ultimately, the study is to unearth the strengths and challenges of the teachers as they prepare to introduce coding in their respective schools. In the light of the forgone, answers were sought for the following research questions;

- **RQ 1**: What perceptions do teachers hold about their a) personal digital dispositions (self-efficacy and technology appropriation), b) digital support in schools and c) the usefulness and possible usage of new digital tool (LePlanner) which was introduced to them.

- **RQ 2:** In what is age influencing the perceptions of the teachers as indicated **RQ1?**

Methods

The study was organised as an online survey for purposively sampled subjects (Cohen, Manion, & Morrison, 2007). These are teachers from schools in Croatia, who are being trained to facilitate the teaching of coding to their children – under the curriculum theme Games for Algorithmic Thinking, in all 24 of them participated in the online survey. The subjects are non-ICT teachers, and they come on board the course from varied knowledge backgrounds. An online questionnaire was administered to the teachers during the first workshop meeting of the project, which was organised on the 5th and 6th of April in Rijeka, Croatia. The instrument sought elicit the perceptions of the teachers in the dimensions of; their personal dispositions towards their capacities to use digital tools and resources and the kind of support their school offer in this direction.

In addition, the instrument elicited perceptions of the teachers regarding the usefulness of the new tool that has been introduced (LePlanner) and their opinion of whether to adopt it as a professional working tool or not. To obtain the descriptive statistics of the subjects, descriptive analysis was done using the SPSS. Similarly, cluster analysis and comparison of differences in

mean vales was done to obtain information about the influence of the ages of the subjects on their perceptions and its related issues.

Findings

Most of the teachers have an above average perception rating across all the five variables under consideration. The responses were homogeneous implying shared perceptions by teachers.

The study discovered two cluster groupings: Cluster 1; had 16 members (66.7% of the sample); Cluster 2, had 8 members, (33.3% of the sample); and did not display exclusive age groupings. Hence age is not an influencing factor in how far teachers will function in their new roles. There is are 66.7% percentage of teachers who do require some attention.

Teachers had concerns; Perceptions teacher hold about their Digital/Computer Self-efficacy and b) perception about school based support - Digital/Computer Self-efficacy was statistically significant across Cluster 1(M =2.547, SD = .410) and Cluster 2 (M = 2.906, SD = .186), t (22) = -2.339, $p = .029$; and Perceived Available Support was significantly different across Cluster 1 (M=2.083, SD =.410) and Cluster 2 (M = 2.625, SD = .415). t (19) = -2.575, $p = .018$

Recommendations

This report constitutes part of the formative assessment process of the project; and aid stakeholders of the project into putting in place post-project sustainability schemes to support the teachers. In this light, it is suggested that concerns arising from the perceptions teachers have about their digital self-efficacy and support in the schools be remedied.

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