4 | A SERIOUS GAME TO TEACH DESIGN TO CHILDREN

Florence Quinche, Denis Leuba

UER Médias et TIC dans l'enseignement et la formation, Haute École Pédagogique Vaud (HEP VD), Lausanne
Contact: florence.quinche@hepl.ch

This educational Serious Game (SG) is a common project between *HE-Arc Ingénierie, HES-SO*, University of Applied Sciences of Western Switzerland (*Image processing & Computer Graphics* Group) and University of teacher education (HEP Vaud, Art and technology Dept.) in Lausanne. The Swiss-French school curriculum (PER) includes the integration of media, technologies and information and communications technology (MITIC) in education, and thus from the first schoolyears in all disciplines. Our hypothesis is that playing SGs could be an efficient way to integrate media and technology in various learning areas. The potential of such games has already been studied and outlined, especially to develop children's autonomy, enable a better differentiation in hetero-geneous classes as well as motivate the pupils [1]. Although SGs are not very common in Swiss primary schools, we can find them sometimes in domains such as languages, maths, geography, and cyberbullying prevention. In France the academies propose a wide selection of games and pedagogical suggestions on the internet (*i.e.* http://jeux-serieux.ac-creteil.fr). In French Switzerland, the applications offered to schools [2] are extremely limited and mostly concern maths and languages. The proposed games (such as *Gomaths.ch* or https://memot.rpn.ch/voca/jsp/index.jsp) are quizzes, based on behaviourist learning schemes, (*i.e.* learning and repetition) or online exercises (http://matoumatheux.ac-rennes.fr) which do not really differ from classical paper problems.

In sciences and geography, where many interesting games exist [3], developing systemic thinking and cause and effect analysis, the only game proposed by the portal is *objectif-sol.ch* (see www.bodenreise.ch/lift_v2/fr), which is rather an interactive website. Several reasons could explain the low use of SGs. First of all, very few games are designed for a classroom use and most of them are not specially adapted to Swiss school programmes. But also, most of the teachers have not received in their professional training neither skills nor examples on how video games could be a powerful tool in their teaching activity. Even if they belong to a generation that played with this type of games, they often have no idea of where to find pedagogical games. Worse, most of them still have misrepresentations of video games as they only know commercial ones and/or consider them only made for pure entertainment. In most of the classes, pupils can only play a game when they have finished all "serious" activities, as a kind of reward, but not as a real time for learning. It is clear that young teachers are not necessarily more innovative, as they tend to reproduce what they have seen in their own education. To integrate ICT in the teaching of manual and creative activities (ACM) we imagined and designed a game platform where pupils would learn several useful abilities to imagine and design 3D objects. Our main targeted audience are pupils between 7 and 12 years old. This game aims at helping them develop 3D perception skills and cognitive abilities, in particular for creative and engineering thinking. Lavergne and Boudier [4] refers to Bloom's taxonomy to classify the corresponding types of gameplay in SGs. Our project corresponds to the second (Analysis) and third (Evaluation) levels and it relates these kinds of competences to strategy builder gameplay and puzzle games.

Currently, primary teachers have very little teaching material to develop that kind of specific capacities. In Switzerland, more than 80% of the primary teachers are women (OFS 2015) who are unfortunately tempted to avoid technical and scientific activities. That's also why we should provide them with an accessible way of teaching this domain. Using a SG to learn to create 3D objects, will provide a strong help in matters they don't feel comfortable teaching. The game structure provides a learning structure, where the children can progress at their own rhythm and receive direct feedback. Examples of teaching sequences, where the game results are integrated to manual activities, will also be provided. In the game, the pupils discover the different stages of a three dimensional object-building process. Several learning skills are necessary, some of them are perception abilities, some others are more conceptual. Progressive steps of problem-solving activities are proposed and many of the corresponding skills could also be useful for other planning activities. The interest of using a SG consists in the fact that the teacher can receive a feedback on the pupil's results and get a synoptic view on his difficulties during the learning process. The image renewal of this field is the other aim of this innovative way of introducing manual and technical activities. Last but not least, this tool will offer equal learning opportunities especially gender equality as it should strongly raise the children interest, in particular girls, in or technical disciplines.

SHORT BIBLIOGRAPHY

[1] Wastiau, P. coord. Kearney, K, Van den berghe, W. (2009), *Quels usages pour les jeux électroniques en classe ?,* Rapport final, éd. European Schoolnet, Bruxelles, 186 pages, online http://games.eun.org/upload/gis-full_report_fr.pdf.

[2] Online pedagogical official resources (Switzerland, Canton de Vaud), April 2016, http://vd.educanet2.ch/liens/primaire/index.html.

[3] Quinche, F. (2013), Game based learning, *Serious Game et éducation,* Berne, educaGuide, 2013, 48 pages, online, fr. / trad. all, 48 pages.

[4] Lavergne Boudier, V.; Dambach Y. (2010). *Serious Game, révolution pédagogique,* Paris, Lavoisier, Hermès sciences.