NEW TOOLS FOR NEW STUDENTS

GAME ABOUT DECISION MAKING ADAPTED TO VARIOUS LEARNING CONTEXTS (GADEMAVO)

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« Play is our brain's favorite way of learning thing » Diane Ackerman, Deep Play

Abstract

The University of Applied Sciences Western Switzerland[1] (HES-SO) faces various challenges. One of the main challenge in the curriculum HES, in every faculty, is to train future professionals to be able to understand real life problems, sometimes critical ones, to sort and organize a plethora of information and make appropriate decisions in extremely fast and changing situations.

On the other hand, university teaching experience shows that students regularly express difficulty in transferring theory to professional practice, particularly in crisis or emergency situations. Besides, if they are able to apply procedures adequately, they are less prepared to produce new solutions to solve complex cases. The e-learning center HES-SO Cyberlearn believes that providing them with a small-scale simulation game will sustain the emergence of proper competence and help students adapt to their future professional world.

Based on problem solving and decision making, GADEMAVO simulation game offers our so-called digital native students a new instrument. Based on playful interaction, GADEMAVO will also provide concrete and meaningful information to students in terms of practical use and feedback, with the aim of helping pedagogical designers realize adapted instruments, fitting the expectations of this new public.

Keywords : serious game, decision making, problem solving, generation Y.

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[1] Referred to in this document as « HES-SO »

New student profiles, new teaching models

The teaching model mostly used in universities is based on oral transmission, inspired by the Peripatetic school founded by Aristotle.2 The entire knowledge is in the hands of the Professor.

In our modern world, he can supplement his teaching with an array of physical tools (blackboard, retro-projector, video-projector) and computing tools (PowerPoint or Prezi presentations, etc.). The audience, crammed in over-crowed lecture halls, listens and the only interaction with knowledge consists in note-taking and practical projects, miles away from ex cathedra lectures.

Compared with older times when, as a disciple worshipping a Master, the student would be listening silently to one of the highest authority in the making of knowledge, the 2012 student profile has, indeed, evolved towards one whose expectations and requirements are new.

Family educational methods based on dialog, integration in a more horizontal society, the impact of mobile technologies, immediate access to a plethora of knowledge available on the Internet, current society's requirements (people capable of taking decisions, thinking ahead, ranking and cross-checking data), have all contributed to shaping up a new student. Whether we use the term Student 2.0, the Now Generation3, Generation Y, the famous «theorized digital natives" so-called by Prenzki [19] [20], every professor will immediately pinpoint the idiosyncrasies. For such students, the act of thinking has become more important than knowledge itself, beliefs take the upper-hand on facts, the attention span has decreased dramatically, collaboration during the learning process reaches out world-wide, authority has no genuine hold on them.

In order to reach the training objectives set by the curriculum and fulfill the professional world requirements of the future graduates, while taking into consideration the characteristics of these new students, it is essential to change the old teaching habits. A possible orientation would consist in offering students a wider variety of interactive learning resources, such as simulation and serious game-playing

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2 The **Peripatetic school, or Peripatetic**, is the philosophy school founded by Aristotle in 335 BC at the Lyceum of Athens. This term also defines the scholars or followers, both Jewish or Muslim. It stems from the Greek root *peripatein*, « to wander » : as Aristotle was believed to wander around while teaching in Athens.[1].
http://fr.wikipedia.org/wiki/%C3%89cole_p%C3%A9ripat%C3%A9tique#cite_note-0
3 The young generation, everything and right away

Games for learning

Studies undertaken by Piaget on knowledge building-up, by Dewey, Freinet or even Montessori, who stemmed from the active pedagogical school, have demonstrated that playing games contributes significantly to the learning process. Additionally, two inquiries undertaken in 1993 and 1999, led by researchers at the University Paul Sabatier (science and medicine) (Toulouse III)4, reveal that 77,5% of students appreciate serious games, and one third claims that the main attraction of a game consists in studying without being aware of it. The most recent inquiry dealt with oral activities carried out in all first year cycles at the IUT University. The use of games was voted in by 87% of the students. Only 37% claimed to enjoy magisterial lectures.

Moreover, this audience shows another aspect of the learner's profile and reveals new characteristics of daily life which impact on a student's life. Keen on interaction with knowledge, wishing to act as a co-expert of knowledge, actually positioned as a customer capable of recognizing its needs and wishes, little inclined to longer concentration periods when the required tasks do not seem to make sense, Generation Y (born between 1980 and 2000) clearly change the way professors consider knowledge transmission. How to make the best use of these characteristics, rather than fighting them in order to contribute to the learning process? This question gave us food for thought when developing the GADEMAVO project. As Prensky noted: « students will not have short attention spans for learning if the approaches you take really engage them. It is possible to get learners of all ages totally involved in learning any subject matter[5] ». (Prensky, 2007).

Generation Y is characterized by its playing habits and considered to be very keen on video games. More than a hundred thousand copies of the "GTA 4" game were sold in Switzerland, to state just one example. The MMO (massive multi users on line) among the French community reaches up to 25% among the 18-24 age range and 19% among the 25-29 age range.[6] Although all students are not compulsory gamers, many play regularly, be it mini games available on their smartphones.

From a pedagogical point of view, using games seems a pertinent approach based on this new learning profile, to involve students, confront them to new ways for addressing knowledge and make them progress in a significant manner. Without replacing the older teaching means, a relatively moderate use of games might encourage students to interact, be active, be participative,

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4 Communication at the Congres of APLIUT, Activités de création et activités ludiques, Angers, 10-12 June 1999 – www.lairdil.org

[5] Les étudiants n'auront pas une faible capacité d'attention en matière d'apprentissage, si votre approche vise à vraiment les faire participer. Il est possible de trouver des apprenants de tous âges totalement impliqués dans l'apprentissage sur n'importe quel sujet. » TdA

[6] http://www.jeuxonline.info/statistiques/

while at the same time getting immersed in a well-appreciated fictive and playful universe, making it possible for the professor to maintain their attention, to strengthen their participation and to reach the set learning objectives.

The GADEMAVO game

The e-learning Center HES-SO Cyberlearn has, therefore, decided to refer to an actual case in order to estimate the possible benefits brought forward by using such a game in some of its university courses, by developing a simulation game. We have developed a game centered on problem solving and decision making, in a context close to real life professional situations, which the students might come across after graduation. Our objective is three-fold:

- Engage the student
- Contribute to the development of the student's ability to make decisions in a complex environment
- Test the use of this game among this audience and assess the results, both from the point of view of the professors (reaching learning objectives and involving students), and the students (offering an unprecedented learning experience and improving their competence)

Problem solving and decision making, although not explicitly taught (except in the context of nursing, where clinical reasoning is a full-fledged field) provide an interesting topic for a game, to induce a student in trying to find his own solutions rather than rely on given procedures. This topic fits in well across most courses taught in the HES-SO schools. In this, in-the-field university, training future professionals, we thought it advisable to adapt the selected topic to the targeted professional context. Thus, with GADEMAVO, the professor can simulate the professional experience by embedding it easily and simply into the game parameters. We designed the game to be of simple and effective use, both for the player and the professor who wishes to include the game among his teaching tools.

The game itself comprises an administrative interface, where the professor can customize the game parameters to the desired professional context and to the gaming procedures he wishes to adopt (interface, awards, game mode) and a client interface, in which the students can play.
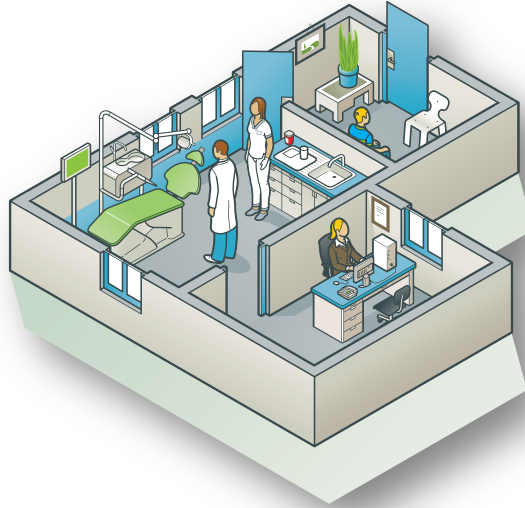
Figure 1 : Example of an interface in the « health » context

The game is played during one week, as a group, on a computer in real time and/or out of the classroom. Once the game is completed, the professor proceeds with the debriefing in presence of the group. The students develop the game from a practical case, with details given step by step. According to the context, they are confronted to a client or a patient and must collect two types of information:

- Arising from the **client/patient's** request and his personal problematic (problem encountered by the patient, client), based on information delivered in text or multimedia format.
- Arising from **previously analyzed data** provided by the system (laboratory analyses, examples of enterprise jobs in need of added value etc.)

The main mission of the game consists in analysing the demand, the needs and the data of a patient (respectively a client) and to take the suitable decisions, with the help of various problem solving tools (SWOT, Risk Management, brainstorming, checklists, discovery matrix, etc.) proposed by the system and used outside of the game context.

A system of won or lost points and certification rules the action in the game. Different steps in the game enable to pass from data collection to decision taking. Students can see the progression of other groups also playing with GADEMAVO and can ask for help. They can also hire new competent

"virtual people" to join the game, in order to solve some of the proposed problems. By answering various quizzes they can win objects which will allow them to interact with the collected analyses.

When they are ready to take a decision, they can propose it to the client/patient, get some feedback and re-submit this step up to three times, while refining their proposition at each step.

A number of sub-missions are proposed to students related to the topic of the game (winning useful objects) or unrelated ones (killing a cockroach). The game evolves by integrating events selected by the professor (change in budget volume (communication), worsening of a patient's condition (physiotherapy) forcing students to reconsider their analysis. This data is made available to participants and they are reminded of it during the game. The specific feature of a pedagogical resource based on gaming can be summarized by three aspects:

- adaptability ,

- conflict, competition, challenge, opposition,

- embedding the learning item into a story

We have dealt with GADEMAVO's *adaptability* on two levels :

1. **Instanciation** : the professor organizes the game according to his preferences, and so he can adapt the metaphor to the desired context, he can define the game's difficulty level, he can provide the case scenario and the resources linked with the case, he can define the impact on the client/patient

2. **Playability** : the game can be adapted in various ways :
   - The oval room space can be customized according to the player's wishes and this will trigger off more or less information on the part of the client/patient (customization of the office/surgery),
   - Objects can be won, which impacts on how the information concerning the case is « read » and interpreted ; competent personnel can be hired to help with understanding/analysing data or performing a basic task,
   - The state of the data progresses according to the various data items sent to the players when the condition or circumstances around a patient/client /mandate change
   - Decisions taken by the players are applied in three iterations ; in the first two iterations, the impact of the decision on the client/patient is made visible by an "emotional" feedback (temper, color,

client/patient's responses) which helps the players decide to either maintain their initial decision or adapt it.

Conflict, competition and challenge were designed by developing :

- **The missions** : apart from the game's main mission (analysing data concerning the patient/client, making and applying the right decisions), secondary missions are proposed to the player(s) : win useful objects (microscope, computers, etc.) which come in handy for achieving the mission, hiring competent people to complete the team, etc.
- **Competition among teams** : if the professor activated this option, the teams can see how every other team is performing, help can also be asked or given by any other team, at any moment,
- **Scores:** every action fetches or costs points to the player(s) : winning useful objects for progressing in the game, taking decisions, hiring competent people, asking/giving help to other teams, satisfying/irritating a client/patient, etc. A graduation tool completes the system: for every 200pts won, the player(s) is given an honorific promotion, thanks to certificates for on-going education : beginner, expert.

Embedding the learning object into a story is represented in the game as follows : at the beginning of the main mission, in the meeting room, the player(s) are told about the story, a role is given to him and he can then customize his avatar by giving it a name, a color etc. The chosen metaphor induces a certain straightforwardness of the story : one (or more) of the professional welcomes a client/patient and deals with the case. Complexity arises with the choice of a particular practical case and the wealth of data which is linked to it.

Development procedures

The e-learning Center HES-SO Cyberlearn developed this game in the course of the last semester of 2012 and the first term of 2013, in html 5, using the Impact development framework; the game relies on a database which stores the game levels reached by each team and all the associated mechanisms. Eventually, it was the office metaphor which was considered (respectively the medical surgery). The game takes place in three rooms: the meeting room,

where the players build their team, receive their mission, win various useful objects for the game; the oval room, where they welcome the client (respectively the patient) and collect information on his case; the situation room, where they analyse all the various collected data proposed by the system (samples, products, blood analyses etc.) and take their decision which is then applied in three successive steps.

The designing team comprised a specialist in the learning process and serious gaming, four professors, each representing three contexts : physiotherapy, communication and computing development. Each professor involved two students who tested the application from the beta version till the final version. Moreover, a computer specialist and a web designer designed and developed the game from the technical point of view. The game runs on a computer or a graphics tablet such as an i-pad.

The results of the project

Currently, at the time of writing this article, the game is over and the next step, consisting in distributing this product, is underway. We have planned virtual demonstrations in the form of video screening, available on our webpage (http://cyberlearn.hes-so.ch), as well as real time demonstrations in the various HES-SO schools, to engage professors to test the game on a life-size scale.

The next step consists in collecting data to analyse the game's usefulness in the initial three development contexts (health, communication and computing) with entire classes. We will ask the students if they appreciated the proposed method, if the professors reached their teaching aims by proposing this new activity, and also whether the students are better prepared for their future professional world by having used a serious game as an additional learning tool. We plan to conduct a quantitative survey to collect this data and to proceed to qualitative interviews in each classroom. The results of this future survey will lead to a publication about a comprehensive procedure on how to analyse needs and implementation, including user feedback.

Developing a serious game is a difficult task. It not only needs didactic imagination, a professional team with the appropriate competence and able to communicate clearly, but also requires solid support from the professors already overburdened by their daily tasks. If the students are readily interested in using new teaching products, the effort involved in developing a serious game is such, that it sometimes becomes necessary to adapt the pedagogical intentions, the design and the game implementation to fit the actual use the

students will make of the game, in order to ensure reaching the main teaching objective: enabling natural and effective progression from basics to be acquired to actual competence to be mastered.

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