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"GREENING" INFORMATION LITERACY THROUGH GAMES

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ABSTRACT:

New Bulgarian University Library gradually shifts its focus toward adopting green technologies and resources for information literacy. Two new technological trends in education: BYOD (bring your own device) and games and gamification are steadily being recognized and adopted by librarians. A jQuery-generated site for mobile devices is used to gamify students' introduction to information literacy. We seek to achieve: 1. a paperless environment; 2. a dynamic and mobile access to information and feedback; 3. switching from a lecture-based teaching style to a more constructivist approach, and encourage students to build knowledge on their own while pursuing a game-like activity; 4. better interaction with lecturers in subject-based teaching. The test instruction was adopted from a library project at St. Cloud State University. The process of collaboration with campus faculty, during the test instruction presented viable opportunity to introduce paperless pedagogy and gaming, as a legitimate pedagogical practice across disciplines on campus.

Keywords: information literacy, m-learning, gamification, green library

1. INTRODUCTION

New Bulgarian University (NBU) has made the strategic choice to become a "Green University" and the NBU Library is working to assert university image as a green institution. The objective is to re-design and deliver library workflow in a paperless format. One of the successfully accomplished initiatives was the environment-friendly "Green Office" that contributed to win "The Best Library 2012" award from the Bulgarian Library and Information Association.

Currently, NBU Library shifts gradually its focus toward adopting new technologies and resources for information literacy. NBU Library pursues arresting training and instruction programs, adhering to our "green line" approach.

Academic libraries are often on the forefront of testing and applying new technologies. Two new technological trends in education: BYOD (bring your own device) and games and gamification are steadily being recognized and adopted by Higher Education practitioners and, respectively, are promoted by academic librarians.

The growing affordability and access to the Internet, as well as the global penetration of mobile devices across all ages, have transformed e-learning into m-learning (mobile learning). Pedagogy and methodology are in a corresponding process of change. Gaming in education is recognized with the potential to promote student motivation and problem-solving skills (Ifenthaler, D., Eseryel, D., & Ge, X. (2012). Game-based learning (GBL) is attractive to Millennials (current students) and Generation Z (incoming students) with the opportunity to bring fun to learning. The shift toward online activities on mobile devices results in print reduction.

2. GREEN LIBRARY

New Bulgarian University (NBU) Library is engaged in green initiatives. The objective is the re-design of library processes and services to achieve the implementation of environment-friendly means of communication (Todorova, R., G. Martionova, D. Mladenova, & M. Lyubenova, 2012). The strategy to turn into a "Green University" is reflected in the Library activities toward accomplishing its strategic goals. The focus is a re-design of library services and offering online reference and e-materials.

2.1. Greening library collections

In pursuit of this goal, the Library started to enlarge e-book and e-journal collections, where the objective is long-term development and maintenance of digital collections. The Library also developed and maintained institutional digital collections. The establishment of own digital collections aims long-term preservation of paper collections – most popular titles, course materials and rare titles from our collections are digitized and accessible on- and off-campus. Digital copies are easy to use and manipulate, transferable and compatible and thus a sustainable re-use of library materials is secured. An increase of e-document delivery has been recognized. E-document based services showed rapid requests increase and online requesting functionality gained popularity. Relocation of finances devoted to acquisition of paper materials allowed investment in new technological solutions and enrichment of the electronic collections. This has an impact and effect on next level of automation at the Library.

2.2. Greening Library Processes

The NBU Library introduced library users to the electronic personal data is scanned, automatically processed and transferred to the integrated online library automation system, where it stored as a digital record that allows comprehensive reference to book records. Library users sign electronically their declaration with Library rules excerpt. Renewing of a Library card is also automated. Library plastic cards are recyclable. Library users can easily loan, renew and hold library materials online, by incorporating RFID technology and integrating it with the library automated system. Self-check machine allows users to perform loan and renew actions.

The process of notifying library users is also automated. E-mail messages are scheduled to library users through the automated information system.

Library users access “My account” space in Library catalogue, where they can check stored Library notices, alerts, etc. sent to them. Alerting and messaging are performed via e-mail or Ask-a-Librarian chat in real time.

The mobile version of the Library web site encourages navigation on different mobile devices.

A credit payment system, where the library cards are charged with credits, allows users to pay Library services.

2.3. Greening Library Services

A request management platform was launched—locally designed software product with Cyrillic interface. Since 2013, the Library upgraded and transferred to an increasingly sophisticated information system for service request management, entirely designed and administered upon an University student project. The promotion and adoption of online information services led to decrease of library visits and growth of library users.

Online support and online services requests resulted in reduced amount of used office paper and re-usable print consumptives – toners for copy machines are recycled and re-used. Waste office paper is collected on regular base and taken away as recyclables. The increased interest in Library collections, both paper and digital was another subsequence.

Eco packing of print library materials and personal belongings with eco-bags from natural materials for multi-use made Library users conscious of reducing their environment-harming attitude and developing new understanding of the digital age. The Library and New Bulgarian University started to collaborate on environment-protecting activities and thus the “Green Office” Initiative emerged. Each University unit is collecting wasted office paper for recycling, where the Library is the leader of the activities under the Initiative. Each year the “Green Office” Initiative helps to collect thousands of kilograms of paper. The New Bulgarian University Library is on the track of establishing itself as an eco-institution. Most of the library processes, services, workflow and collections are steadily turning paperless and are maintained online. The next task is to seek turning information literacy green.

3. GAME-BASED LEARNING AND LIBRARIES

3.1. Game and Gamification

Ralph Koster defines a game as a system of rules that, taken together, creates a simplified model of some aspect of reality (Koster, 2013).

Game based learning (GBL) is a type of game play that has defined learning outcomes. Generally, GBL is designed to balance subject matter with gameplay and the ability of the player to retain and apply subject matter to the real world. GBL describes an approach to teaching, where students explore relevant aspect of games in a learning context designed by teachers.

Teachers and students collaborate in order to add depth and perspective to the experience of playing the game.

Gamification takes game elements (such as points, badges, leaderboards, competition, achievements) and applies them to a non-game setting. It has the potential to turn routine, mundane tasks into refreshing, motivating experiences.

Gamification is defined as the process of applying game mechanics and game thinking to the real world to solve problems and engage users (Phetteplace & Felker, 2014, p. 19; Becker, 2013, p. 199; Kapp, 2012). Gamification requires three sets of principles: 1. Empowered Learners, 2. Problem Solving, 3. Understanding (Gee, 2005).

Some authors, e.g. Malykhina (2014), fail to make the distinction between games and gamification in the educational process and attribute gamification to the influx of games in the curricula, rather than to the application of game elements as defined above.

3.2. Gaming in the Library

The academic library has an important role in establishing gaming and gamification as a legitimate learning approach. The following factors determine the library as the developmental hub for game-based activities in education. 1. The academic library serves the entire campus. 2. Academic librarians teach mostly short (credit-wise) sessions, which is an advantage to start and complete the implementation of game-based activities in the curriculum process. 3. The development of sound pedagogical gaming by librarians can enable them to service and consult departments across campus in replicating the pedagogical success of applying gaming and gamification in the curriculum process.

The support to develop elaborate educational games is incomparably small to the funding for gaming entertainment industry. The lack of finances makes it only logical for academic institutions to combine their resources across campus in an effort to enable gaming and gamification as a recognized approach to learning and teaching. Within the campus setting, the library can prove to be the preferable sandbox for possible testing and implementation of game-like activities and projects. Academic libraries are well-known as early adopters of new practices across campus. Using games for fostering information literacy skills among students has been underway for a long while (Smith, 2007; Walker, 2008; Markey, Swanson, Jenkins, Jennings, Jean, Rosenberg, & Frost, 2009; Buchanan, & Elzen, 2012; Porter, 2012; Becker, 2013; Brown & Kaspar, 2013; Margino, 2013; Phetteplace & Felker, 2014; Walsh, 2014). Regrettably, information literacy skills remain the focus of most academic libraries in 21st century. Skills taught through digital literacy elude academic librarians. Considering the importance of gaming in education, Alan Gerschenfield, a publisher of computer games, underlines the connection between games in education and the importance of teaching digital literacy (Fletcher, 2014); a literacy, which academic libraries often neglect on account of information literacy.

Not surprisingly, such discrepancy regarding the importance of digital literacy determines the attitude toward the leadership role of the academic library in the game-based learning practices on campus. Buchanan & Elzen (2012) are on the opinion that librarians do not have to be experts in the "gaming" area, but to only understand the place video games could have in libraries and adjust their services accordingly. In the same fashion, Phetteplace & Felker (2014) fail to see the grand

responsibility of the academic library on campus as early adopters and in terms of video games, they advocate only for engagement of patrons and expanding outreach programs. On the other hand, Becker's (2013) study of gaming in libraries takes him to Shapiro's (2014) conclusion, namely, level up students to the learning challenges by creating their own games and/or co-designing and manipulating games.

4. GREEN CROSS-CULTURAL LIBRARY PROJECT

This Library project streamlines the application of recent technologies and the "green" strategy. The Library aims to achieve: 1. a paperless environment; 2. a dynamic and mobile access to information and feedback; 3. switching from a lecture-based teaching style to a more constructivist approach, and encourage students to build knowledge on their own while pursuing a game-like activity; 4. better interaction with lecturers in subject-based teaching.

4.1. Technology

Recent report by McGraw-Hill Education Research claims that over 80 percent of students use mobile technology to study (Belardi, 2015). A St. Cloud State University campus technology survey yields similar results. While numbers can be argued, the tendency of students to use mobile devices, being those their own (BYOD) or school-issued is on the rise. Mobile devices are in the heart of the recent wave of gamification in "many industries, including business, marketing, and education," as well as the "evidence that game elements, if used properly, can increase engagement and motivation (Spina, 2013, p. 7).

A jQuery-generated site for mobile devices is available to gamify students' introduction to information literacy. Students are using their mobile devices (smart phones, tablets, etc.) to access information through a mobile Web site and are expected to accomplish set of tasks, which reflect their knowledge of literature and research procedures in the library.

4.2. Preparation

After a presentation at the 2014 Library Technology Conference at Macalester College in Minneapolis, Minnesota, Sarah Thorngale of the Brandel Library in Chicago shared the template for the library orientation using mobile devices. In the fall of 2015, first-year students from the COLL 150 classes at St. Cloud State University (SCSU) tested the site, as adapted for the use of the SCSU Library. Different versions of the site are available at <http://web.stcloudstate.edu/pmilttenoff/bi/>.

NBU library adopted the test instruction as used at SCSU, and respectively, at Brandel Library. The consequent discussions lead to the idea to compare projects and results and seek cross-cultural similarities and differences, thus bringing opportunities to test, improve the idea and apply it in regular classes across campus.

The site was translated from English to Bulgarian, keeping the idea intact and adjusting the content where necessary. In collaboration with an instructor from the Law Department, the site was modelled after the content and requirements of Financial and Tax Law course at NBU.

The test at NBU was conducted with second-year students in the Law Program. Two months in advance, the students were introduced to the experiment and instructed accordingly.

The experiment to use the site at other NBU courses was promoted by the librarians through printouts with QR codes containing login information and requesting a week to complete the assignments listed on the site.

4.3. Results

The authors of this study decided to compare the first thirty responses by students, respectively from NBU and SCSU. Test training is based on a range of 19 assignments. These were divided to 13 open-ended questions, 5 multiple choice question and 1 single choice question. Assignments

are accompanied with instructions and part of them has a corresponding image. Through a Help Button students contact a librarian for a live assistance.

Students from the two universities have showed equal competences in using the software. The NBU group completed 82,1% of the assignments against the 82,1% from the SCSU group.

Equal percentage (100%) of students from the cited universities answered to the questions „What did the librarian help you with?“, „What hours are reference librarians available?“, „Say you have a question for a librarian who is clearly busy with other work. How will the librarian feel about being interrupted?“.

Around 80%-90% of the respondents gave their feedback to the questions „Name three library resources available to you for research projects“, „What are the two most valuable things you learned from this session?“.

The received answers were between 70%-80% on „The librarian was knowledgeable and prepared for this session.“, „What book did you find?“, „What's the call number?“.

Students from the two universities found it difficult to complete „Find an Article“ assignment, where the SCSU result was 76,6%, and 60% for NBU. Depending on the degree of implementation the assignment was positioned on 15th place among 19.

Despite the derived similarities in responding, some deviations are also observed. SCSU students have answered to a group of questions on how to locate information within an encyclopedia (100%), while the NBU group returned a result of 56,7%. The respondents from SCSU have not completed the optional „How many college libraries own a copy of „Title of book“?“, „Wander around the first floor to find five other things you can check out from the library“, where 90% NBU representatives have shared their opinion.

Quantity analysis reveals that the query „What is one question you still have about using the library?“ have gained less interest - 66,7% for SCSU and 53,3 for NBU. This shows that students in USA and Bulgaria should be urged at the beginning of their study to formulate library-orientated queries.

The quality analysis of the groups of assignments shows main similarities and differences in the responses of the two target groups. The answers to the basic questions „What book did you find?“ and „What's the call number?“ in the two groups is comparatively equal (SCSU -92,3% , NBU - 92,8%). Game instructions are fairly precise and helped the achievement of a higher rate in results. The group of multiple choice questions and open-ended questions also introduces similar responses. The multiple choice question „What did the librarian help you with“ progresses for SCSU with the average score of 4,5 responses, where NBU received 3,6 answers. Where the most important issue for both groups of respondents is „Find items“ (fig. 1).



Figure 1: Question „What did the librarian help you with?“

To the open-ended question „Name three library resources available to you for research projects“ the average number of answers is 2,7. Most valued are „Books“. It is interesting that the query about electronic resources have received only 2 answers in each of the groups of respondents. The result confirms the consistency of adopting m-learning. In the course of the game, students become aware of and learn how to use the diverse library resources. Again the multiple choice question „Say you have a question for a librarian who is clearly busy with other work. How will the librarian feel about being interrupted?“ results are almost the same (fig. 2).

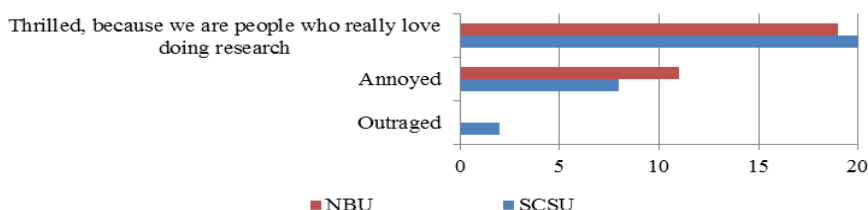


Figure 2: Question „Say you have a question for a librarian who is clearly busy with other work“

To a lesser extent, students were able to define three true keywords in response to the question „Identify Keywords for Your Topic“, 71,3% on the SCSU score against 74,4 - NBU.

The SCSU students has realized 100% true answers to the „Find an Article in a data base“ question, while in NBU the success is 43,3%. The complexity of the topic in the law field and the necessity to search in multi-language databases has provoked that particular outcome. About 83,3% of NBU students were successful on „What hours are reference librarians available?“, while the SCSU students show only 53,3%. The difference is probably due to the extended working time of the reference desk at NBU and the habit of the students to ask assistance from librarians.

5. CONCLUSION

The idea to apply gamification methods in an academic library proves to be a challenge. The results from the experiment proved that gamification can be considered as an alternative on the way to green technologies; the use of BYOD and the mobile site ruled out the use of any additional resources (Antonelli, 2008). Application of such methods in education falls into the understanding of the Millennials and Gen Z how education must be conducted. In the spirit of constructivism, learners preside over knowledge acquisition by determined the time and pace of the learning process.

Employing the combination of jQuery and Google Forms solution allows real-time online assessment, without the necessity to print any data at any moment of the assessment process. The ability to collect live data during the learning process is of paramount importance, since it brings identification of the different parts of the learning process for each individual student and allows the instructor/librarian to adjust live the learning outcomes for each student.

The process of collaboration with campus faculty, during the test instruction presented viable opportunity to introduce paperless pedagogy and gaming, as a legitimate pedagogical practice across disciplines on campus. Adopting such methods of instruction is a challenge for academic librarians, since it requires strong technological skills and solid digital literacy. The cross-cultural analysis of the compared groups of students reveals strong similarities on thinking and actions among Millennials from different cultural and linguistic background. The authors of this study underline the initial phase of the research and invite further interested parties to join in adopting the mobile site, collect data and participate in a wider and deeper cross-cultural analysis. The comparative analysis among the groups reveals that young people from the different parts of the

world accept m-learning with game elements, which encourage students to build knowledge on their own while pursuing a game-like activity.

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