

# Enhancing skills in bachelor classes by gamifying learning management systems

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**Abstract**— Technical skills are insufficient to gain employment in big organizations and in-demand professions in the current labor market. Current and aspiring firm executives place a significant focus on the development of soft skills since they are crucial to work performance. To improve the soft and hard skills of students through the usage of a learning management system in their lessons, a gamification framework must be developed. To do this, skills are categorized into four distinct groups: Communication, Punctuality, Information and Digital Literacy, and Professionalism. A grading rubric is intended to assist the framework in assigning points to users based on their engagement with the learning management system. Each skill will be awarded between 0 and 3 points according the grading rubric. To encourage students to engage more with the system, conventional gamification components are included. Future milestones involve the development of a digital wallet to store the framework's acquired badges.

**Keywords**—gamification, learning management systems, soft skills

## I. INTRODUCTION

The mission of contemporary higher education is to guarantee that students obtain a varied education with the end goal of being work-ready. Universities are increasingly attempting to produce graduates who not only possess information but can also apply it. This naturally leads to the conclusion that soft skills are now equally as crucial and necessary as hard skills to assure employment in the current labor market.

Technology has a substantial influence on the abilities businesses need from business graduates today [1]. The move from an industrial economy to an information society and office economy has resulted in an increased focus on honesty, communication, and adaptability in several occupations. Historically, technical abilities, often known as hard skills, were the sole skills necessary for a successful career. However, today's workplace demonstrates that technical skills are insufficient to obtain employment in major corporations and in-demand positions. Current and aspiring company leaders place a strong emphasis on the development of soft skills since they are essential to job efficiency. Soft skills must be stressed more in university curriculum, even though many good educational programs include technological abilities. Research on soft skills revealed that 75% of long-term success in the workplace is dependent on people's talents, whereas just 25% is dependent on technical knowledge [2]. Another research demonstrated that technical knowledge adds just 15% to one's achievement, whereas soft skills account for 85% of success [3]. Employers place the strong emphasis on soft skills for entry-level job performance [4].

In order to enhance the students' soft and hard skills through the use of a learning management system for their classes the creation of a gamification framework is required.

In recent years, gamification has emerged as a clear trend for promoting user engagement and enhancing good outcomes from service use, such as boosting user activity, social connection, or the quality and productivity of their actions [5]. Today's pupils were born and raised in a technologically advanced environment. The majority of students have a distinct learning style, a fresh perspective on the educational process, and enhanced teaching and learning requirements. As previously stated, gamification is the application of game-like thinking, strategies, and components to non-game contexts. The employment of gaming mechanics not only enhances the quality of learning, but also encourages participation in the educational process [6].

The inclusion of tasks and activities that students must successfully complete is the key feature of gamification. Performance in activities leads to the accumulation of points, the attainment of a new level, and the acquisition of rewards. All of these prizes are designed to encourage the completion of predefined learning objectives, which is the enhancement of their soft skills, in our case.

## II. SOFT SKILLS IN LITERATURE

According to [4], soft skills and general knowledge boost a person's self-confidence and increase their confidence in their ability to advance professionally. Moreover, these talents generate additional career prospects. As a consequence of this, our gamification framework will monitor the most crucial non-technical abilities in the learning management system, in accordance with what academics have indicated and what research on the job market has discovered.

University of Sydney records indicate [7] the qualities that each of their graduates should have by successfully finishing their studies are depth of disciplinary expertise, critical thinking and problem solving, oral and written communication skills, information and digital literacy, inventiveness, cultural competence, interdisciplinary effectiveness, integrated and professional, ethical and personal identity and influence. The selection of these characteristics was based on the aspects that businesses appreciate in graduates and reflects the talents that employers would want in a graduate.

Meanwhile, according to a poll conducted by the National Association of Colleges and Educators (NACE), the top five skills employers want on a candidate's resume are the following: leadership (80.1%), teamwork (78.9%), written

communication (70.2%), problem-solving (70.2%), and oral communication (68.9%) [8]. Finally, [9] based on a survey that was conducted on 57 business executives show that on a 5-point Likert scale the five most important soft skills are integrity (93.0%), communication (91.2%), courtesy (84.2%), responsibility (71.9%) and interpersonal skills (61.4%).

### III. SKILLS TO TRACK

Taking into account both the characteristics of students that are deemed to be of utmost importance by university institutions and those that emerged as important in surveys conducted after communicating with employers, it can be safely concluded that soft skills are as important as hard skills for detecting and rewarding their acquisition during the educational process. Specifically, the following table (TABLE I) outlines the skills groups an individual will need to possess after finishing a course and the specific skills that our framework will track.

TABLE I. SKILLS GROUPS TO TRACK

Skills Groups	Skills
Communication	1. Written communication 2. Good listener 3. Sociable
Punctuality	4. Completes the work 5. Self disciplined
Information and digital literacy	6. Locate data 7. Effective use of digital resources
Professionalism	8. Fast learner 9. Teachable

#### A. Grading Rubric

According to [10], despite the fact that both students and employers agree that soft skills are essential for a professional career, most students tend to believe that their soft skills are at a high level, even if this is not the case, demonstrating that they are unable to evaluate themselves accurately. The majority of companies discover that new hires eventually lack or fall short of the soft skills they first claim to possess. This research finds that this disparity may be related to the absence of a mechanism for testing these skills. Thus, a well-defined grading rubric may be used to address this issue. However, skills are frequently acquired to some extent, which will be taken into consideration while creating and applying to our system the grading rubric.

The grading rubric will award pupils between 0 and 3 points each competency. The "Written Communication" competency takes into account the number of forum threads to which the user has responded in the Learning Management System (LMS). The user will receive zero, one, two, or three points depending on whether (s)he responded to [0%,20%], [20%,60%], [61%,80%], or [81%,100%] of forum posts created by students in this specific course. For rating the "Good Listener" skill, the rubric compares the number of threads to which the user is subscribed to in relation to the total number of threads in the course, and for the "Sociable" skill, it compares the number of forum posts created by the user to the total number of forum posts in the class.

The "Integrity" skills group is associated with the user's submitted assignments. In specifically, the "Completes the Work" skill is proportional to the number of submitted assignments relative to the total number of tasks provided to

each user in a course. The "Self disciplined" skill is assessed based on the number of tasks submitted by the predetermined deadline.

The "Information and Digital Literacy" skills group is connected to the number of readings of the available resources in the LMS. The "Locate Data" skill is assessed from 0 to 3 points based on the number of times a student used a course file relative to the student who utilized the resources the most. The skill "Effective use of digital resources" is impacted by the number of file reads done by the user in comparison to the class average and the student's final grade in comparison to the class average final grade.

Finally, the "Professionalism" skills group is proportional to the grades of the user. The "Fast learner" skill is graded from 0 to 3 according to the success rate of the first assignment of the student compared to the rest of the class. The "Teachable" skill is awarded with 0 to 3 points according to the progression of the assignments' and quiz's grades, where the user is awarded with 3 points when (s)he keeps getting better scores throughout the duration of the class.

### IV. THE GAMIFICATION FRAMEWORK

Some of the available gamification elements in well known LMS' gamification tools is the existence of points that are collected from the course's activities, the levels and the progression to the next level bar. Leaderboards, also seem to motivate users by comparing themselves to the rest of the users or notifications to remind them the badges they have earned [11].

We chose to use badges, points, leaderboards, and progression bars in our gamification framework based on the typical gamification features seen in LMS gamifications. At the end of the class, the student receives a "Communication" badge by accumulating points in the first three categories. Regarding the "Punctuality" skills group, a progression bar will indicate the required number of points to advance to the next level. In addition, a scoreboard displaying the user's current position relative to the rest of the users in this skill group will be accessible, as seen in the figure below (Fig. 1). Users will receive a punctuality badge at the conclusion of the course.

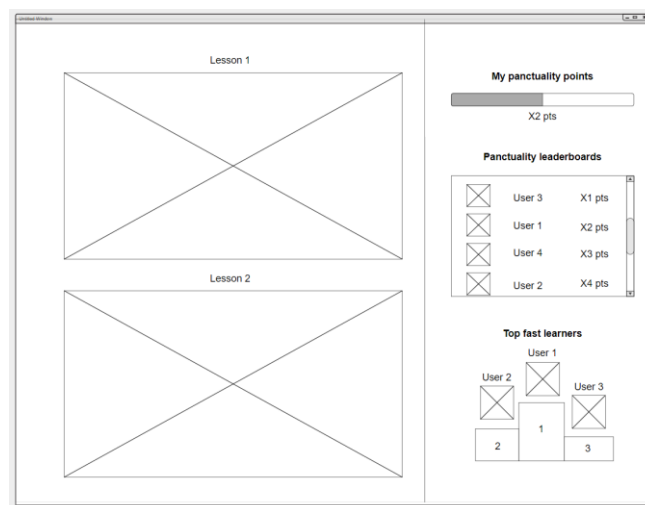


Fig. 1 Mockups showcasing the gamification tools of the framework

Regarding the "Information and digital literacy" skills group, a constant indicator of the times that the student has

used a certain educational material will be present and a badge will be rewarded to the users based on the points they gathered in the skills of this specific skill group. For the professionalism skill group, a badge will be awarded at the end of the course period and a top fast learners digital podium will be accessible by all the users as seen in Fig. 1.

Finally, there will be a teacher's view where (s)he will be able to see the rank and the name and surname of every student in every skill in a leaderboard, as seen in Fig. 2. This is crucial to the teacher as (s)he will be able to organise his/her educational material based on the progression and the needs of her/his students and help them gain soft skills apart from hard skills.

Communication		Punctuality	Digital Skills	Professionalism
Rank	Student	Completes the work	Self disciplined	Total points
#1	Name, Surname	X points	Y points	T points
#2	Name, Surname	X points	Y points	T points
#3	Name, Surname	X points	Y points	T points
#4	Name, Surname	X points	Y points	T points
#5	Name, Surname	X points	Y points	T points

Fig. 2 Mockups showcasing the teacher's view of the gamification framework

## V. OUTCOMES AND FUTURE WORK

The gamification framework developed to be compatible with any LMS seeks to employ conventional gamification techniques to support the development of students' hard and soft skills via their engagement with the digital learning environment. In the future, we want to build a gamification plugin that is compatible with the most popular LMSs. In addition, the badges acquired by users will be developed using the open badges prototype, allowing students to store them in a digital educational wallet and display them to potential employers.

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### REFERENCES

- [1] Mitchell, G. W., Skinner, L. B., & White, B. J. (2010). Essential soft skills for success in the twenty-first century workforce as perceived by business educators. *Delta Pi Epsilon Journal*, 52(1).
- [2] Schwab, K. (2010, September). *The global competitiveness report 2010-2011*. Geneva: World Economic Forum.

- [3] Wats, M., & Wats, R. K. (2009). Developing soft skills in students. *International Journal of Learning*, 15(12).
- [4] Rao, M. S. (2010). *Soft skills: Enhancing employability: Connecting campus with corporate*. IK International Pvt Ltd.
- [5] Hamari, J., Koivisto, J., & Sarsa, H. (2014, January). Does gamification work?--a literature review of empirical studies on gamification. In *2014 47th Hawaii international conference on system sciences* (pp. 3025-3034). Ieee.
- [6] Kiryakova, G., Angelova, N., & Yordanova, L. (2014). *Gamification in education*. Proceedings of 9th International Balkan Education and Science Conference.
- [7] Graduate qualities. (n.d.). The University of Sydney. Retrieved December 3, 2022, from <https://www.sydney.edu.au/students/graduate-qualities.html>
- [8] Job Outlook 2016: The Attributes Employers Want to See on New College Graduates' Resumes. (n.d.). *Job Outlook 2016: The Attributes Employers Want to See on New College Graduates' Resumes*. Retrieved December 3, 2022, from <https://www.naceweb.org/career-development/trends-and-predictions/job-outlook-2016-attributes-employers-want-to-see-on-new-college-graduates-resumes/>
- [9] Robles, M. M. (2012). Executive perceptions of the top 10 soft skills needed in today's workplace. *Business communication quarterly*, 75(4), 453-465.
- [10] Stewart, C., Wall, A., & Marciniak, S. (2016, July). Mixed signals: do college graduates have the soft skills that employers want?. In *Competition forum* (Vol. 14, No. 2, p. 276). American Society for Competitiveness.
- [11] atutor.github.io. (n.d.). atutor.github.io. Retrieved December 3, 2022, from <https://atutor.github.io/>