The impact of gamification elements on engagement in online learning

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Abstract 🧐

This paper explores **the motivational impact of gamification elements on users' learning processes and efficiency in online learning environments.** The research focuses on various aspects such as course participation, the completion of learning objectives, and user satisfaction with the course. User research methods employed include a literature review, case studies, user interviews, and user testing to ascertain the motivating effects of gamification elements in online learning contexts. The research outcomes aim to validate the hypothesis that **the new design methods can serve as motivating factors for users in online learning**, and **offer recommendations for enhancing the user experience.**

Introduction & Background 🧐

From professional development courses to full degree programs, the internet has become a vibrant classroom for millions of people. While online learning offers clear advantages such as flexibility in time and location, and limitless access to learning materials compared to traditional classroom learning, it also faces the significant challenge of how to motivate users to maintain enthusiasm and ongoing participation in learning (Anderson 2011). As it evolves, a pervasive issue has become increasingly prevalent: **low user engagement and lack of focus in online education negatively affect the quality of instructional courses.**

Online classrooms often encounter issues of students being distracted and disengaged. Students in virtual classrooms frequently report feeling isolated, disconnected, and lacking motivation. In contrast, games capture user attention through interactive challenges, rewards, and engaging narratives, allowing users to become immersed and fully invested. In this context, the concept of gamification has received strong attention from online learning researchers and experts. Originating from the widespread global popularity of video games, this concept involves integrating game design elements into non-game environments (Deterding et al. 2011). **The juxtaposition between these two digital experiences raises key questions about the nature of engagement and immersion in virtual spaces.**

Design 🧐

Problems Define

Sense of participation
The online classroom lacks the challenge and interactive parts of the game, and is more about users' passive acquisition of knowledge and lack of users' active thinking.

Sense of achievement
The online classroom lacks the sense of achievement and progress in the game, and lacks a clear goal in the classroom, thus lacking motivation and interest.
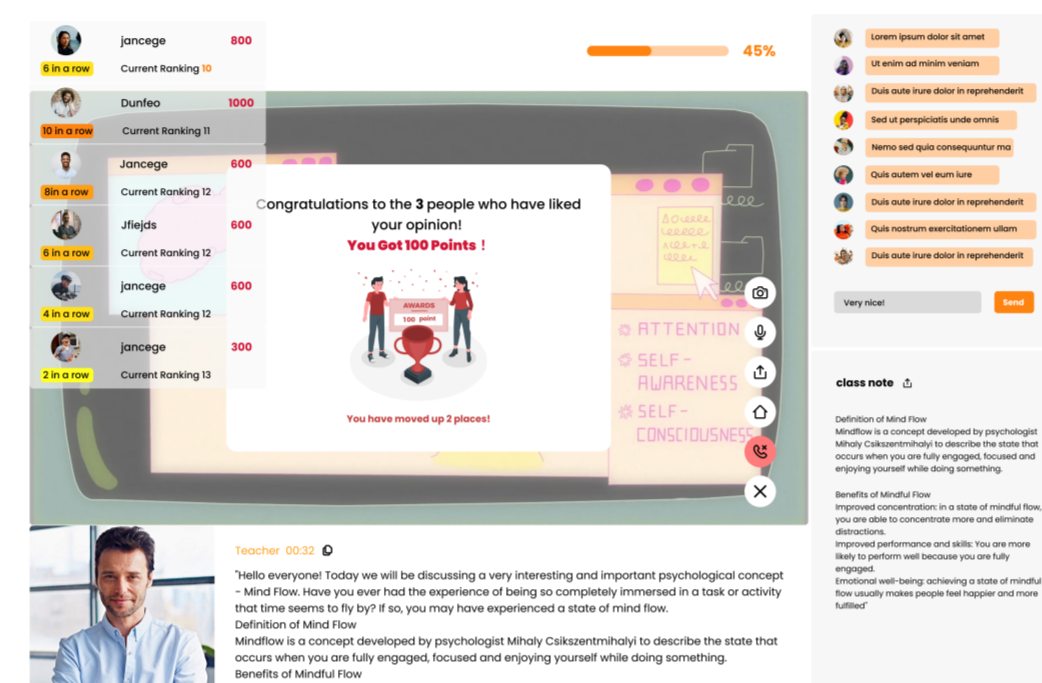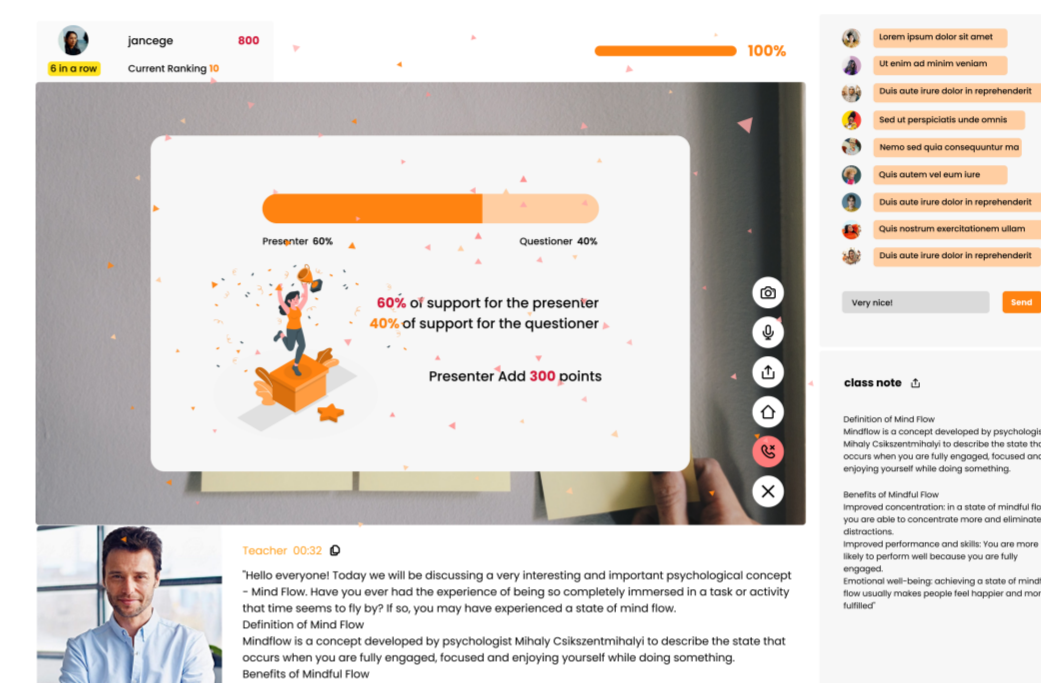
Concentration
Online classroom lacks the supervision of offline classroom teachers and the single classroom environment, in the lack of interaction in the online classroom, students are easy to be attracted to other things in the unsupervised environment.

Socialising
Online classroom multiplayer classrooms lack the social element of gaming, which leads to feelings of isolation and disconnection.

Design Solution

Sense of achievement
Progress bar, leaderboard to increase user's sense of achievement
Instant feedback: each question shows points earned, increasing user motivation and interest.
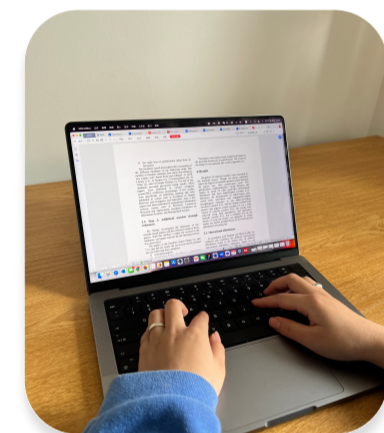
Concentration&Socialising
It can be used for any questioning session after the group discussion and after the teacher's class is over, to enhance students' concentration through the incentive of gaining more points.
Encourages student communication, reducing isolation and disconnection in online courses
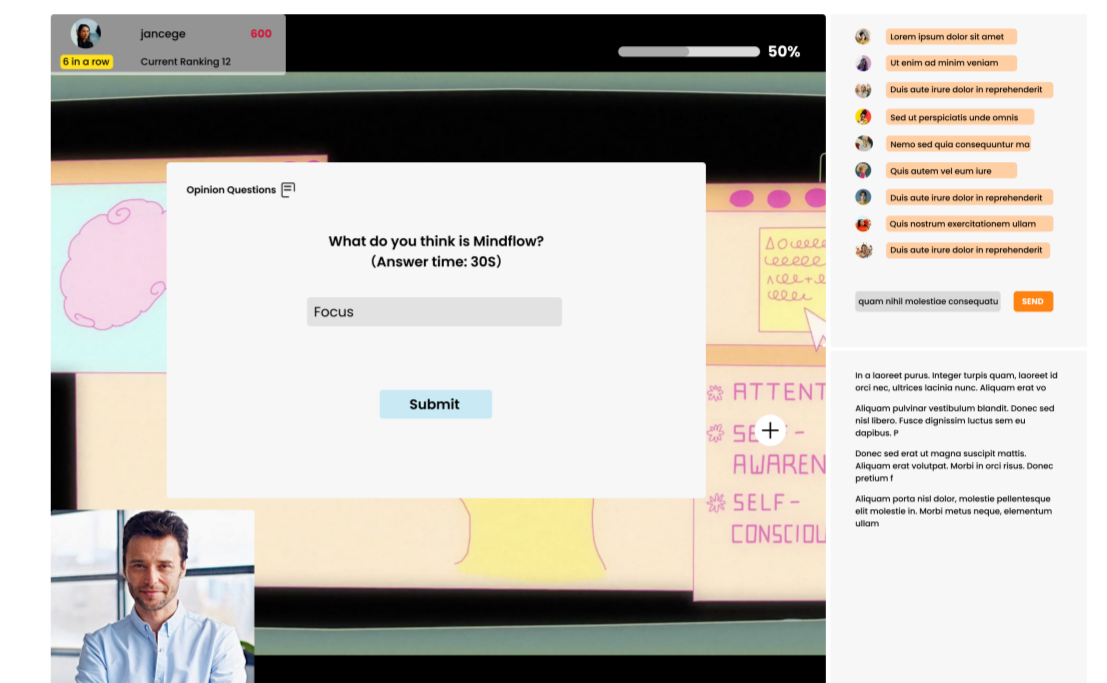
Sense of participation
A variety of interactive methods to enhance student engagement, e.g., you can give credit for favourable responses.

Study Methodology 🧐

Literature review   **Case Studies**   **User interviews**   **User testing**

Findings on Literature Review, Case Study & Interview 🧐

Core factors

Lack of focus	Lack of social interaction
Low engagement	Inability to gain a sense of achievement

Leads to

General Problems

No motivation
Users are mostly passive in acquiring knowledge, leading to a lack of active thinking and participation.

No Easily distracted
There are no clear objectives in the classroom, leading to diminished motivation and interest in learning.

No communication
Students lose concentration easily. Unlike teachers and environments that can focus students' attention, online environments tend to distract students easily.

Lack of engagement
Multi-user online classrooms lack the social element common in games. This leads to a sense of isolation and disconnection among students.

Leads to

Results

A general problem of reduced user engagement, motivation and social interaction

Learning effectiveness and student satisfaction were also reduced.

Testing & Evaluation 🧐

A/B test Process

A/Btest 1

A+: Course content — Test 1 — Course content — Test 2 — Course content — Test 3 — Course content — Test 4

A: Course content — Ending Test (Includes tests 1, 2, 3, 4)

A/Btest 2

B+: Course content — Test 1 — Course content — Test 2 — Course content — Test 3 — Course content — Test 4

B: Course content — Ending Test (Includes tests 1, 2, 3, 4)

Comparing quiz accuracy rates and collected experience feedback.

Result of the A/B test
Quantitative analysis

		Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
		F	Sig.	t	df	Significance One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
RESULT01	Equal variances assumed	16.000	.016	−2.000	4	.058	.116	−.66667	.33333	−1.59215	.25882
	Equal variances not assumed			−2.000	2.000	.092	.184	−.66667	.33333	−2.10088	.76755
RESULT02	Equal variances assumed	.000	1.000	−4.950	4	.004	.008	−2.33333	.47140	−3.64216	−1.02450
	Equal variances not assumed			−4.950	4.000	.004	.008	−2.33333	.47140	−3.64216	−1.02450

Qualitative analysis

Course interface and interactivity

ANALYSIS: Most users were satisfied with the course interface and interactivity, but some users suggested some improvements. Two users mentioned that the interface design needed improvement, such as possible ambiguity in icons and buttons.

The extent to which the gamification elements helped learning

Analysis: The gamification element was perceived as helpful for learning among the majority of experimenters, but a minority of experimenters felt that the helpful effect was not strong.

Effectiveness of the points mechanism

ANALYSIS: Almost all users found the points mechanism to be effective or very effective. Most users would like to link points to class grades or other forms of incentives.
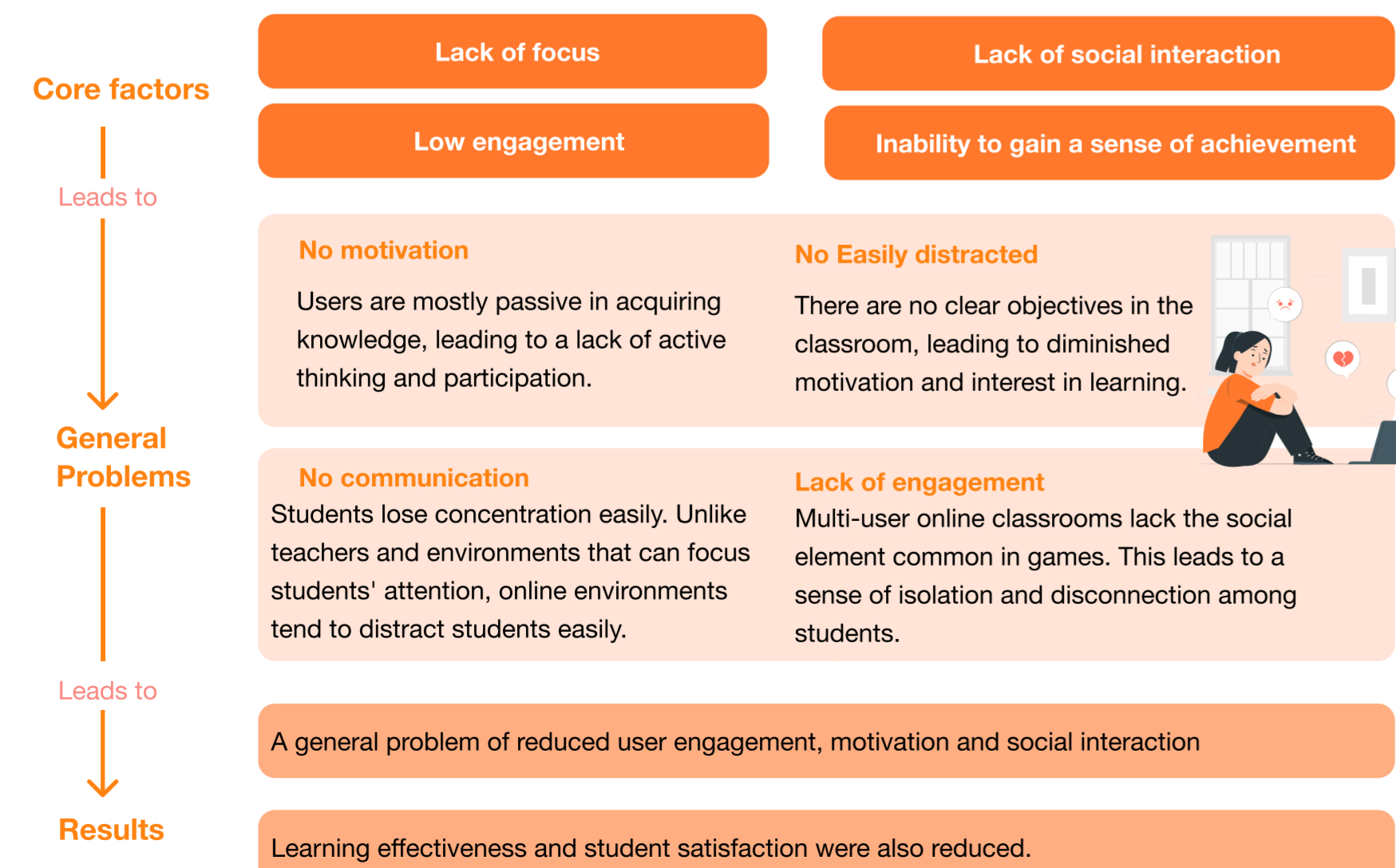
Conclusion & Future Work 🧐

RESULTS 1.
Quantitative analyses showed that the variability of test results in group A was not related to design,Group B test results are related to the design.

RESULTS 3.
Users perceived the design of interaction and point mechanism in the experiment as an effective motivational tool and had different needs and expectations in terms of the point mechanism.

RESULTS 2.
Qualitative analysis showed that the inclusion of gamification elements in the online course appealed to users and improved class attention.

Synthesis of findings

In quantitative terms, design had a significant effect on Group B, but not on Group A.

In qualitative terms, gamification elements and design interactions proved to be effective motivational tools.

Given the different needs and expectations of users regarding point mechanisms, subsequent designs should be more personalised and diverse.