Gamification & Learning in Higher Ed

4 February 2025

The Premise...

Congratulations, You Logged-In!





Using the MakerLab

What is

gamification?

Gamifying Classroom Components

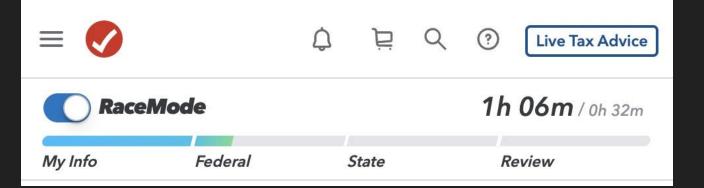


Designing & Implementing a Gamified Class

Your Gamified Class

The definition, err definitions?

- The process of game-thinking and game mechanics to engage used and solve problems (Zichermann and Cunningham 2011)
- The use of game design elements in non-game contexts (Deterding, et al. 2011)
- Using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems (Kapp 2012)

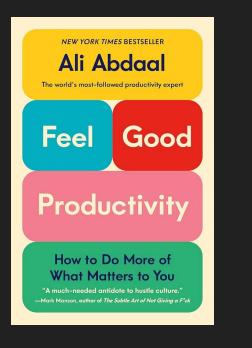


Slido.com \rightarrow 2002042

To what extent do you currently deploy gamification in courses as part of your teaching?



Using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems (Kapp 2012)





GAMIFICATION IN HIGHER EDUCATION A HOW-TO INSTRUCTIONAL GUIDE

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SIERRA ADARE-TASIWOOPA ÁPI AND NATHAN K. SILVA

Let's play a game!

Kahoot.it Pin# 688205

Answer these questions based on what you know or assume about gamification.

Achievement Unlocked: Gamification Pre-Test

Association between real-world experiential diversity and positive affect relates to hippocampal–striatal functional connectivity

<u>Aaron S. Heller</u> ^I, <u>Tracey C. Shi</u>, <u>C. E. Chiemeka Ezie</u>, <u>Travis R. Reneau</u>, <u>Lara M. Baez</u>, <u>Conor J. Gibbons</u> & <u>Catherine A. Hartley</u> ^I

Nature Neuroscience 23, 800–804 (2020) Cite this article

Making every day tasks an adventure increases satisfaction







Intrinsic Motivation: Challenge, Curiosity, Control, Context

Reframing Classes as a Place for Learning Rather than Grades

What are the most important outcomes from your class?



Trying is often penalized with a loss of points, how can we change the narrative and mitigate the risks of failing in the classroom?

Achievement Unlocked: Prioritizing Learning

Extrinsic Motivation: Praise, Punishment, Public Recognition, Prizes

What if we were better at encouraging trying?

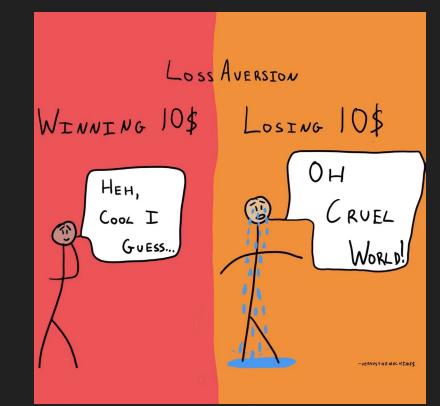
• You learn through failing!

- For play to work: low stakes (lots of opportunities to fail!) and encourages relation (to others, to content, to format)
- Reinforces growth mindset, "practice makes better"
- "If we weren't so concerned with failure, how much more could we learn?"

Improving student performance through loss aversion.

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Smith, B. O., Shrader, R., White, D. R., Wooten, J., Dogbey, J., Nath, S., O'Hara, M., Xu, N., & Rosenman, R. (2019). Improving student performance through loss aversion. *Scholarship of Teaching and Learning in Psychology*, *5*(4), 278–288. https://doi.org/10.1037/stl0000149



Growth Mindset

WELCOME TO

SUMMER ISN'T OVER JUST YET! AND WHO SAYS SCHOOL CAN'T BE FUN? TODAY WE'LL START A FULL YEAR OF EXCITEMENT BY LOADING UP ALL THE SUPPLIES WE'LL NEED TO MAKE THIS ENTIRE YEAR FEEL LIKE AN ACTION-PACKED TRIP THAT YOU'LL NEVER FORGET!

-

YOUR GOAL IS TO WORK WITH YOUR TEAMMATES TO GATHER ALL TEN INVENTORY ITEMS BEFORE TIME EXPIRES, AND YOU CAN COLLECT THEM IN ANY ORDER THAT YOU'D LIKE.



Effects of Gamifying Course Content

Don't take my word for it, let's look in the literature!

TABLE I RESULTS OF THE PRETEST AND THE POST-TEST

GROUP	Pre-test		Post-test		LEARNING GAINS		WILCOXON SIGNED-RANKS TEST FOR PAIRED SAMPLES	
	М	SD	М	SD	М	SD	p-value	Effect size (r)
Control (N=81)	3.3	2.1	5.4	2.3	2.1	2.6	< 0.001	0.45
Experimental (N=99)	3.4	1.6	6.3	2.0	2.9	2.4	< 0.001	0.54



TABLE II Items of the Questionnaire

ot only did gamifying	
increase test	
erformance, students	
liked it!	

р

Item 1 My overall opinion on the learning methodology used is positive. 2 The learning methodology helped me learn. 3 The learning methodology was appealing and motivating. 4 The learning methodology made learning fun.						
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3 The learning methodology was appealing and motivating. 4 The learning methodology made learning fun.						
4 The learning methodology made learning fun.						
5 I needed help to complete the activities.						
6 All the resources were suitably integrated into the platform from which I access them.						
7 I would like to learn using the same methodology in the future.						
Items only included for the control group						
8a My overall opinion on the videos is positive.						
9a I prefer to learn using videos than playing educational video games.						
Items only included for the experimental group						
8b My overall opinion on the educational video game is positive.						
9b I prefer to learn playing educational video games than using videos.						

TABLE III Results of the Questionnaire

Item	Control group		Experimental group		Mann-Whitney U Test	
	М	SD	М	SD	p-value	Effect size (r)
1	4.0	1.0	4.5	0.8	0.003	0.20
2	4.0	1.0	4.1	1.1	0.265	0.05
3	3.6	1.1	4.2	1.0	< 0.001	0.27
4	3.2	1.1	4.2	1.0	< 0.001	0.43
5	2.0	1.4	2.1	1.5	0.790	0.06
6	4.5	0.8	4.3	1.0	0.471	- 0.01
7	4.0	1.0	4.4	0.9	0.006	0.19
8 (a/b)	4.1	1.0	4.3	1.0	0.128	0.08
9 (a/b)	3.6	1.1	4.2	1.0	< 0.001	0.26

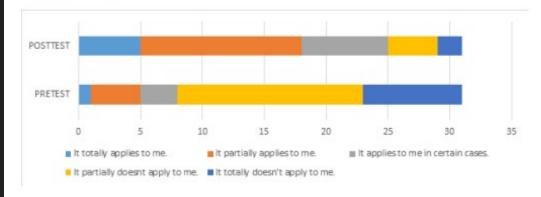


WITH GAMIFICATION TO COLLABORATIVE LEARNING IN CHEMISTRY LESSONS

Elena Rudolf Secondary School of Economics Maribor, Slovenia

Figure 13

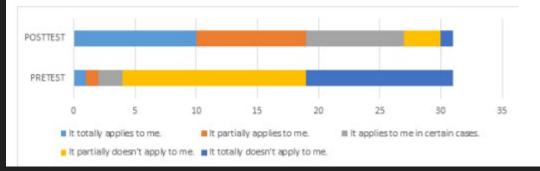
The Influence of Cooperative Learning on the Understanding of Learning Content (Comparison of Pre-test and Post-test)



Gamification increased students' appreciation of the benefit of cooperative learning on content knowledge

Figure 14

The Influence of Collaborative Learning on Learning Motivation (Comparison of Pre-test and Post-test)



Collaborative learning, by way of gamification, increased students' motivation for learning

Gamification in education: a mixed-methods study of gender on computer science students' academic performance and identity development

Leila Zahedi¹ · Jasmine Batten¹ · Monique Ross¹ · Geoff Potvin² · Stephanie Damas³ · Peter Clarke¹ · Debra Davis¹

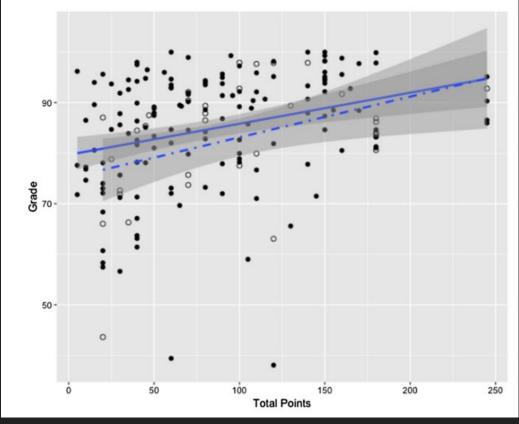
In the beginning, I had a hard time, like I was kind of struggling with it, but I don't know, it's just you have to learn a whole new thing. But now that I've kind of got into it, I like the challenge. It's definitely a challenge, but it's something I'm willing to put effort into... Because even if I'm not like a hundred percent confident, I feel like I'm getting there. Like I can easily work my way towards that.—Sarah.

What I did like about SEP-CyLE, though, is the point system. So, groups would basically go against each other, and that does motivate a lot of students... It's like how people are addicted to games, because of reward systems... We would always be on top of it and be like "Yo, do your SEP-CyLE assignment so we can get more points, so we can get extra credit."—Jinx.

like, oh I'm going to get points! I like that... [I felt] proud... Like I really, really love it... Competitiveness can be fun. So, it's kind of like a fun way of learning.—Nicole.

Team-based gamification closed gender –based achievement gap!





The Impact of In-Classroom Non-Digital Game-Based Learning Activities on Students Transitioning to Higher Education

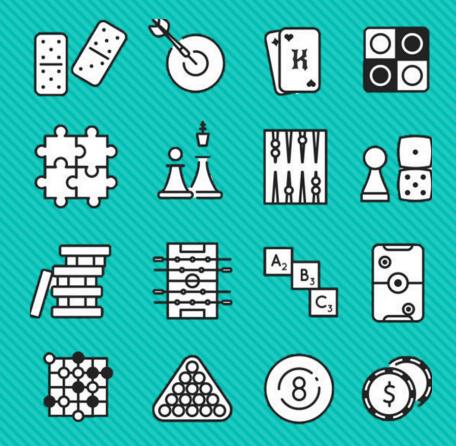
by Chitra Balakrishna 🖂 💿

Gamification increased student attendance and engagement

Collaborative learning, by way of gamification, increased students' motivation for learning



Data	Experimental Group	Control Group	
Avg weekly attendance for the module (%)	87%	74%	
Avg weekly attendance for three other modules	Module 1 (74%)/Module 2 (70%)/Module 3 (72%)	Module 1 (74%)/Module 2 (70%)/Module 3 (72%)	
EoM Q3: How actively did you participate in the classroom activities	4.71 (very actively)	3.2 (somewhat actively)	
Average assignment score mean (Std dev)	74 (11.41)	67 (11.02)	
Average group component score mean (Std dev)	86 (8.12)	71 (9.80)	
Average score across three other modules (Std dev)	65 (10.63)	69 (10.42)	



Types of Games

Classic Standbys

BINGO

Human circulatory system





Periodic Table	Atoms	Elements, Compounds, and Mixtures	Chemical Bonding	Ions and Isotopes
\$1	\$1	\$1	\$1	\$1
\$2	\$2	\$2	\$2	\$2
\$5	\$5	\$5	\$5	\$5
\$10	\$10	\$10	\$10	\$10
\$20	\$20	\$20	\$20	\$20

Quiz Bowl

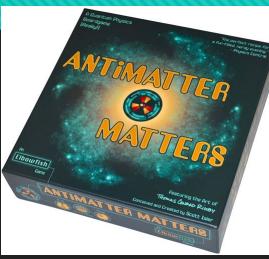
Jeopardy

C AhoSlides

Kahoot!

Readymade Games & Apps

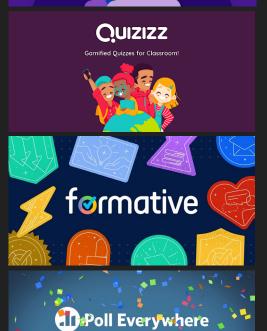












Competitions

Building from Resources & Databases

Q

CHEMISTRY

MATH

EARTH

SCIENCE

BIOLOGY

biointeractive.org ow Savanna Plants Get Nutrients DETRITIVOR This activity focuses on how ants get these three nutrients from their environment. σ Carbon 0 urce: Carbon dioxide (CO,) in the air lants use CO, during photosynthesis to build o eatu ining photosy inthesis, light energy is co chemical energy and stored in carbon-con molecules, which are then used to make such as starch, cellulose, and other organ There are tons hese organic compounds are food for 1111111 the eco Muscle of activities, See our animation for more details on pl ЦĨ Activity for Solving Crimes The Art of Hiding Sodium Channel Evolution in with the Necrobiome Electric Fish This activity explores an image of a moth wi SOIL MICROBE This activity explores content presented in ti unusual markings on its wings, which serves This activity guides the analysis of a publishe animated video Solving Crimes with the scientific figure from a study that investigate simulations, how gene duplication contributed to the Necrobiome, which describes the microbial and adaptation. Source: Ammonium (NH, *) and nitrate (NO,) in the soil evolution of electric fish hanges associated with decomposing Plant nitrogen is found in amino acids, the building blocks of proteins, and nitrogenous bases, which are components of DNA, RNA, and ATP. corpses. Anatomy & Physiology | I Appendix II-Game Play Chart and Science Practices Film Activities High School - General | High School - AP/IB High School - General | High School - AP/IF worksheets you Source: Phosphate (PO43) in the soil Plants use phosphate groups to make nucleotides for DNA and RNA, phosphale groups to make nucleotides for D (energy carrier molecules). ~ PIET Contraction can gamify SIMULATIONS TEACHING RESEARCH INITIATIVES DONATE Use the cards to fill in the bubbles and discove ow nutrients move through the savanna ecosyst 1 1 available in ~ public Interactive Simulations phage X databases for Science and Math EXPLORE OUR SIMS and ait a ri a phet.colorado.edu Over 1.5 billion simulations delivered

Make your own!

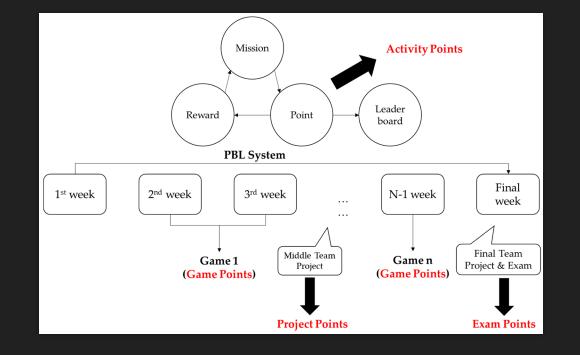
Species Competition Game ↓



class were really fun. We all got to talk freely and bounce ideas off of each other which I liked." Parasite

"I'm really glad I took this class and learned a lot! The parasite game was also super fun."

Gamify your class from top to bottom!



Learning Performance Styles in Gamified College Classes Using Data Clustering

A more involved learning environment in the Game points and badges Share pages of points and can reflect students' gamified story: badges with classmates to completing the learning learning performance, generate chatting and process according to evaluate the learning discussion students' personal process preference Game points 3 Badge Share 使 吃 丁

Effects of gamified interactive e-books on students' flipped learning performance, motivation, and meta-cognition tendency in a mathematics course

Jiahua Zhao¹ · Gwo-Jen Hwang² · Shao-Chen Chang³ · Qi-fan Yang⁴ · Artorn Nokkaew⁵

by Sungjin Park 💿 and Sangkyun Kim * 🖂

Want to Learn More?



ground, hybrid, and

eLearning settings

a roadmap to a gamification of your <u>course – detail &</u> plans!

Second Edition

CRC Press



Congratulations! You have completed Level 1: What is gamification?



Questions? Submit them here!

Join us next Tuesday at <u>3pm</u> in the MakerLab!