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A Pedagogy for Learning and Assessment based on a popular Internet Challenge

By

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Abstract

There are several innovative strategies that enable students from higher education to learn in a play-way fashion. Education experts have been exploring the possible methods of effective learning with minimal technological usage for third world countries. One observation is this direction has been that peer groups influence learning among other things. This paper describes an innovative peer-learning pedagogy – Ice Bucket Challenge that is simple, interesting, and expects students to think out-of-box. It challenges students to strive beyond their boundaries and learn faster.

Keywords: Innovative teaching-learning methodology, peer learning, simulation

Introduction

Innovative learning has now become a subject of active interest in society, with emphasis on simple and effective strategies to help students understand various subjects and their applications. Many educational experts as well as experienced teachers have come up with interesting pedagogies aimed at helping students learn interactively and with interest. Some of these are flipped learning, blended learning, project-based learning and Puzzles.

Students in higher education tend to be affected by their peer groups in many ways [17]. Every institution, and by extension, every class, has an intra-class dynamic that is highly cohesive [18]. Peers influence each other in performance in Examinations. Seniors influence dressing style and behavior, among other things. There has been considerable discussion among academia on how this cohesion can be utilized as an effective mechanism to help students in reinforcement learning. “Ice Bucket Challenge” (IBC) [1] is an effective methodology in this direction.

Ice Bucket Challenge was an internet phenomenon where participants “challenged” their friends, colleagues, etc. to throw a bucket of cold Ice on themselves and post a video of the same. This was to be done within a deadline of twenty four hours, failing which participant had to make a donation to charity. On successful completion, the participant was free to challenge some more specific people for the same.

Stephen Hawking was one of the ones challenged – he was unwell and his children took his place. In all, 2.4 million people participated in this challenge worldwide with donations amounting to 240 million dollars. The activity itself does not amount to much, but, it created an internet sensation – causing a frenzy of people, many of them celebrities, to take the challenge and post videos. It is a classic example of the influence of peer-challenge and how effective it is. We propose a variation of the Ice-bucket challenge that suits the classroom environment, but, is equally effective. This pedagogy is a good example of the Heuristic-Nonalgorithmic approach to teaching-learning methods such as investigatory or

discovery, semi-disciplined, problematized and creative way of learning, where students know the basics of problem solving before they endeavor into real-world problems they can solve.

Literature Survey

Several experts have come up with innovative methodologies for teaching. This section studies the literature on teaching methods such as Flipped Classroom, Personalized Learning, Inquiry-Based Learning, Project-Based Learning, Puzzles, Open-Ended Questions, the now extremely popular Hackathons, Peer teaching and Blended Learning. Khan et al. [4] have come up with a blended learning model with e-learning support for higher education. Kintu et al. [5] investigate the blended learning design features of learner interactions, offline support, LMS tools and technology quality as causatives for student satisfaction, motivation and learning outcomes. Bishop etal.[6] have studied the flipped classroom approach that uses video lectures and textbook reading as Home Work, and, active, group-based problem solving as classroom activity.

Bishop et al.[17] have further supported the use of flipped classroom as student choice over lectures.Nandigam et al. [7] highlight the popularity of serious game-playing for faster and quality learning. Freisn et al. [8] have reviewed research literature on inquiry-based learning with the case study of the state of Alberta focused on the three principles of Engaged Learner, Ethical Citizen and Entrepreneurial spirit. Kokotsaki et al. [9] have presented literature survey of a variation of inquiry-based learning called Project-Based Learning with real-world problems as context. Badger et al. [10] have presented a detailed treatise on puzzle-based learning with special focus on STEM subjects. Reja et al. [11] presents a comparative study of the open-ended Questions versus the closed-ended type. Open-ended Questions are more popularly being used for student feedbacks than as a methodology for teaching-learning, as analyzed by Waski et al. [12].

Leng [13] presents a case study that analyses the feedback of higher education students pursuing third year in Mathematics on peer-learning as a teaching method. Soltani et al.[14] have studied the factors for the success of six hackathons organized during 2012-14. Velázquez et al.[15] have presented the main learning styles of students and the teaching criteria mapping to each group, with special focus on the ICTs to be used in each case.Landøy et al. [16] have describe the various teaching-learning methods and a classification of the teaching methods.

IBC in Academics

The basic aim of the IBC is to implement reinforcement learning via game playing. The intent is to enable students understand the various facets of a concept and its real-time implementations through group dynamics. It increase intra-class interaction via game playing and also inculcates a sense of kinship and improves confidence levels of students.We now take a look at the various terms used in this section –

[1] Bucket list – the list of students who are right now being challenged.
[2] Challenger – the student/teacher who has challenged specific student for a problem.
[3] Participant – a student who has been challenged and is currently in the process of finding a solution.
[4] Commentator –students who give periodic feedback on the posts made by participants on the challenge from time –to-time.
[4] Achiever – one who has successfully completed the bucket challenge and posted

solution on the common platform.

[5] IGiveUp – one who is unable to complete the challenge within the deadline. This includes cases where a student is ill or has some other emergency and is therefore unable to take up the challenge.

[6] End gamer – Last person on this round of IBC, who gets to start the next round.

[7] Deadline – a time limit in date, hours and minutes for completion of a challenge.

[8] Deadpool – participants who are unable to complete in the bucketlist.

[9] Basic Principle – No student can appear twice in the bucket list in the same round.

The Ice Bucket Challenge starts from a teacher challenging a student at random on solving a problem from the subject being taught on a platform visible to the entire classroom. Only one student is chosen. The student solves the problem in stipulated time and posts the solution. He/She also calls out any student(s), having devised his/her own problem, again, from the subject. The students who have been called out have to solve the problem within the time limit. On succeeding, (Achievers) they can call out random students from the class and so on. The excitement is in not knowing who will call them out and when. The students who are unable to solve their problem (IGiveUp cases) have to learn the solution from the challenger and lose their right to challenge the others. If there are no more participants on the bucket list, the teacher intervenes and becomes the challenger.

Commentators play a vital role in that they encourage participants to play well and to excel. Students, at any point of time have to be in one of the three groups – challenger, participant, commentator. All students who are not challengers or participants are commentators. No challenger is allowed to comment. Where a solution is not accepted by the challenger, the teacher intervenes and acts as third umpire. Decision of the teacher is considered final for all such conflicts.Commentators have to ensure that they do not inadvertently make fun of the participants, thereby discouraging them.At the beginning of the game, the Bucket List has the first challenger. The game ends when the bucket list empty and the number of participants left is zero.

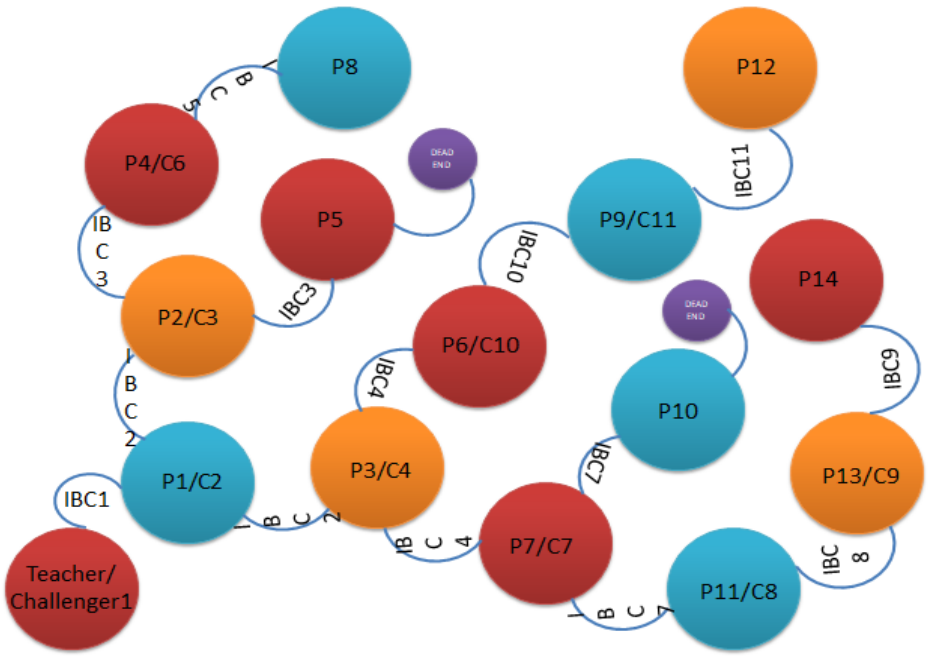

Fig.1. *Nodes in a IBC Network. P1 through P14 represent participants. IBC1 through IBC11 represent challenges. Dead-End represents IGiveUp case.*

3.1 The Ice Bucket Challenge Tree

The Ice Bucket Challenge game can be represented as a tree (Figure 1). We assume that each challenger is allowed to challenge a maximum of two unchallenged students. The Ice Bucket Challenge tree has the teacher or challenger 1 at its root. Every internal node is a unique participant, who becomes challenger in second phase. It is possible that the participant "gives up" during the challenge, and is therefore out of the competition. Such a participant is not permitted to challenge the remaining students. This leads to a "Dead-End" and the node is added to Dead Pool.

3.2 A Simplified Approach to Ice Bucket Challenge

A simpler approach to Ice Bucket Challenge is to have a classroom session with text books and reference books and to extrapolate from the existing to the unknown with creative thinking. This method requires more time to complete, but, gives rise to novel and yet unforeseen solutions. The approach also requires challengers to rise above their thought barriers and ask fresh and unthinkable queries.

3.2 As a tool for Assessment

The process of Ice Bucket Challenge is similar to that of an assessment. The process can be made more compact with smaller problems and shorter deadlines so the process can work similar to a Hackathon. The outline of the method remains the same.

Simulation

We simulate the general algorithm for Ice Bucket Challenge learning methodology in Python 3.10.6 with 10 participants. Each participant has an equal opportunity of being challenged by existing participants. This is achieved using a randomizer. Each participant has a 20% chance of failure for the purpose of this experiment. Again, as specified earlier in this paper, we allow every successful participant to select upto two participants for the next challenge with equal probability. Every step of the code has random functions embedded to ensure that the simulation

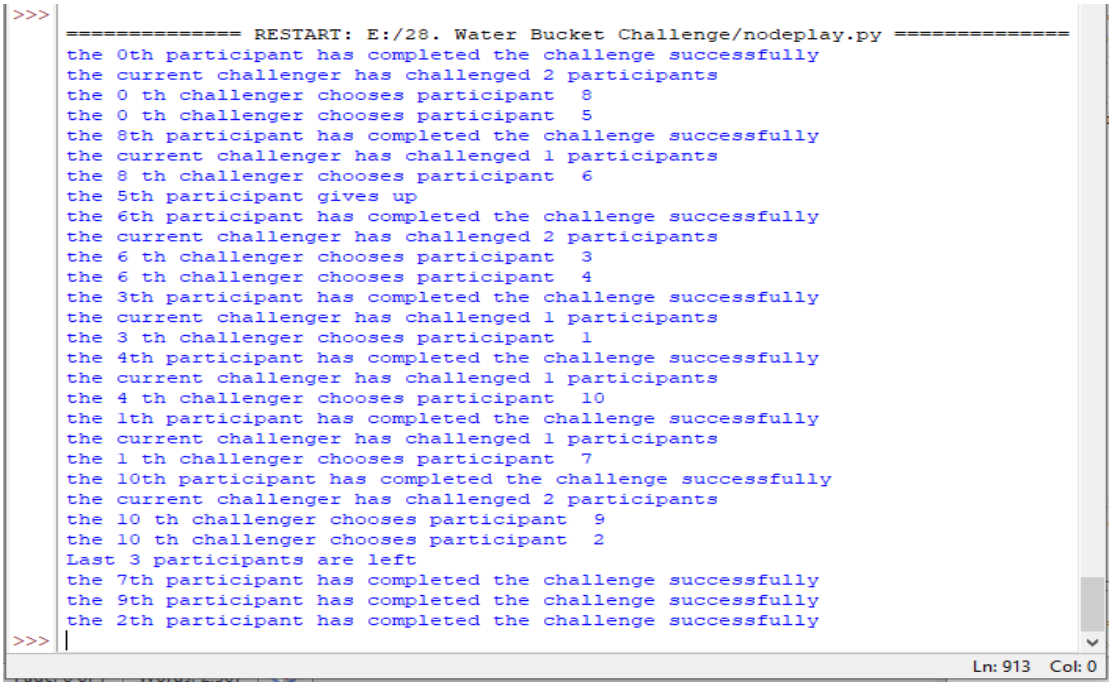

Figure 2. *Simulation Results for Ice Bucket Challenge with 10 students*

is perfect. Queue data structure is implemented to maintain list of the participants in the current challenge. Once a challenge is successfully completed, participant is deleted from the Queue. The output of the code is given in Figure 2.

For ease of understanding, we use the following notations in explaining the output -

Let P, Q and R be three participants. Then,
P(Q,R) stands for an achiever "P" challenging two other participants "Q" and "R".
P(Q) stands for an achiever "P" challenging one other participant "Q".

P( ) stands for a participant who has given up, and therefore, has not challenged anyone else.

From the output in Figure 2, participants are challenged in the order –
0(teacher) , 0(8,5), 8(6),5( )*, 6(3,4), 3(1), 4(10), 1(7), 10(9,2).

For example – participant 8 calls out participant 6 and participant 10 calls out participants 9 and 2.

Participant 5 gives up, hence the empty subset.

Participants 7,9 and 2 do not have any more peers to challenge and therefore just complete their respective challenges.

Challenges

The process takes a long time, from classwork point-of-view. A Challenger has to challenge another. The process may be linear or in the form of a tree, each branch being allowed a time interval of 24 hours. It can be lesser if it is an Ice Bucket ChallengeHackathon. Therefore, the challenge of each student should be from a dynamically increasing knowledge resource – from the subsequent chapters and so forth. Thus, every student's challenge is from a different context from the same subject. There can be variations in the complexity of problems by different students and therefore the time estimate of 24 hours may become too little or too much. Students have different strengths and weaknesses in terms of subjects. Therefore, it becomes necessary that all participants are of a peer group with similar callings. In Higher Education, most students from the third year onwards have similar background with respect to the core subjects in their knowledgebase. Therefore, the activity is fun rather than drudgery. Also, there is a possibility that students share their challenges and solutions with friends whom they call out during the actual challenge. This can be avoided by making this exercise last minute. Completing a round with all students in class could become a problem. This can be sorted by continuing the challenge beyond class hours as assignment.

Conclusions

An innovative pedagogy called "Ice Bucket Challenge" is discussed. The methodology, Pros and Cons of the method are also dealt with. A Simulation study is implemented to showcase the efficacy of the methodology.

Future Scope

This method can be applied not only to a classroom, but also to any learning group of peers online as well. There can also be some more variations added to the same in terms of deadlines and types of challenges.

References

https://en.wikipedia.org/wiki/Ice_Bucket_Challenge

Herodotou Christothea, Sharples Mike, Gaved Mark, Kukulska-Hulme Agnes, Rienties Bart, Scanlon Eileen, Whitelock Denise (2019). Innovative Pedagogies of the Future: An Evidence-Based Selection. Frontiers in Education. 4. 10.3389/feduc.2019.00113

Khan, Asif & Qayyum, Noor-ul & Shaik, Mahaboob Sharief & Ali, Abdullah & Bebi, Ch.Vijaya. (2012). Study of Blended Learning Process in Education Context. I.J.Modern Education and Computer Science. 9. 23-29. 10.5815/ijmecs.2012.09.03.

Kintu, M.J., Zhu, C. & Kagambe, E. Blended learning effectiveness: the relationship between student characteristics, design features and outcomes. *Int J Educ Technol High Educ* **14**, 7 (2017). https://doi.org/10.1186/s41239-017-0043-4.

Bishop, J.L. & Verleger, Matthew. (2013). The flipped classroom: A survey of the research. ASEE Annual Conference and Exposition, Conference Proceedings.

Nandigam, David & Sremath Tirumala, Sreenivas & Baghaei, Nilufar. (2014). Personalized Learning: Current Status and Potential. IC3e 2014 - 2014 IEEE Conference on e-Learning, e-Management and e-Services. 10.1109/IC3e.2014.7081251.

Dr. Sharon Friesen, David Scott. Inquiry-Based Learning: A Review of the Research Literature.

Kokotsaki, D. Menzies,V.andWiggins,A.(2016) Project Based Learning – A review of the literature,Improvingschools.,19(3).pp.267-277.

M. Badger, C. J. Sangwin,E. Ventura-Medina and C. R. Thomas. A guide to puzzle-based learning in STEM subjects.

Urša Reja, Katja Lozar Manfreda, Valentina Hlebec, and Vasja Vehovar. Open-ended vs. Close-ended Questions in Web Questionnaires. Developments in Applied Statistics.FDV, 2003. pp. 159-177.

Wasik, Barbara & Hindman, Annemarie. (2013). Realizing the Promise of Open-Ended Questions. The Reading Teacher. 67. 10.1002/trtr.1218.

Lim, Leng. (2014). A Case Study on Peer-Teaching. Open Journal of Social Sciences. 02. 35-40. 10.4236/jss.2014.28006.

Soltani, Poryah & Pessi, Kalevi & Ahlin, Karin & Wernered, Ida. (2014). Hackathon – a method for Digital Innovative Success: a Comparative Descriptive Study. Proceedings of the 8th European Conference on Information Management and Evaluation, ECIME 2014.

Velázquez, Ana & Assar, Saïd. (2009). Student Learning Styles Adaptation Method Based on Teaching Strategies and Electronic Media. Educational Technology & Society. 12. 15-29.

Landøy, A., Popa, D., Repanovici, A. (2020). Teaching Learning Methods. In: Collaboration in Designing a Pedagogical Approach in Information Literacy. Springer Texts in Education. Springer, Cham. https://doi.org/10.1007/978-3-030-34258-6_10.

Bishop, J., & Verleger, M. A. (2013, June), *The Flipped Classroom: A Survey of the Research* Paper presented at 2013 ASEE Annual Conference & Exposition, Atlanta, Georgia. 10.18260/1-2—22585.

Lena M. Wieland, Johannes D. Hoppe, Anett Wolgast, Ulrich W, Ebner-Priemer (2022). Task ambiguity and academic procrastination: An experience sampling approach.

Learning and Instruction. 81.101595. ISSN 0959-4752. https://doi.org/10.1016/j.learninstruc.2022.101595.

Stefania Manca(2020). Snapping, pinning, liking or texting: Investigating social media in higher education beyond Facebook, The Internet and Higher Education. 44. 100707. 1096-7516. https://doi.org/10.1016/j.iheduc.2019.100707.