

# Conceptualizing SDG Based Edu- Escape Rooms for Health Science Colleges

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## ABSTRACT

**Introduction:** The study explores the designing and implementation of SDG- based educational escape rooms, a game based learning session designed to raise awareness on Sustained Development Goals (SDGs) among health science graduates, preparing them for global citizenship. These real -life escape rooms simulate real life societal challenges, allowing students to experience their impacts while fostering teamwork, decision making, and critical thinking skills. **Methods:** SDG based Edu- escape room was conceptualized on the goal-1 “No Poverty” with objectives to foster creative implementation strategies to overcome poverty-related challenges, and to develop effectively language proficiency for real-world communication. Using AI tool, ChatGPT a storyline was created. A linear path design with 3 sequential rooms including crossword puzzle, role plays and framing sentences leading to the other in a manner was created aligned with the 3 steps involved in SDG attainment. Eighteen students from undergraduate programme of Pharmacy participated in this SDG based Edu- escape room game, with 6 students randomly assigned to 3 batches. **Results:**The pretest and post test of knowledge on SDG a had a mean value of 5.3 with a p value of <0.001. The student feedback on the activity revealed a favourable and positive perspective with many considered it as a thrilling and a highly enjoyable activity for learning SDG. **Conclusion:** Raising awareness on SDGs among Health Science graduates is crucial as their future roles are closely connected to the global well-being. Edu- Escape Rooms serves as a highly favourable pedagogical tool for sensitising Health science learners to global challenges while developing essential skills

**Keywords:** Sustainable Development Goals (SDGs), Edu-Escape Rooms, health science programmes, English Language Learning.

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## INTRODUCTION

Holistic growth of students encompasses comprehensive development of individuals focusing on intellectual, emotional, social, physical and ethical dimensions that favour the existence in the community. The education system should create environment that supports quality education for sustainable practices that ensures developmental benefits to the society at large.

### *Sustainable Development Goals (SDGs)*

The Sustainable Development Goals (SDGs) have stepped in to widened the horizon of educational vision of preparing graduates for global future citizenship. The Sustainable Development Goals (SDG) are a set of 17 interconnected global goals established by the United Nations in 2015 which provides clear road map for the community related preparations for these future social workers. There are altogether 17 major SDG goals with 6 of them falling into the social dimension. SDG - 3 is dedicated for attaining ‘good health and well being’ and with four others related to healthy living (SDG 1- No Poverty , 2 - Zero Hunger, 4 - Quality Education, 6- Gender Equality).

Graduates of Health Science programmes need awareness, knowledge and social skills training to attain these health goals.SDG insists on global partnership among all nations including educational forums to plan actions to nurture the graduates with social responsibilities.

Every learning institution strives to adopt SDGs into its curricula. Learning experience are designed to produce graduates with in-depth domain knowledge along with clusters of social skills for the betterment of the society. In the context of Health science education, preparing graduates for future social role is the primary concern. Enhancing critical thinking trains graduates to apply their knowledge and skills for solving social problem there by preparing them for their future healthcare challenges.

### *Edu - Escape Rooms*

An edu-escape room is an educational tool that combines elements of traditional escape rooms with learning objectives. It is designed to engage students in an immersive, interactive environment.

It is in the form of a game played by a team of students as players on a given learning topic where they have to 'escape' from a room, usually their classroom which is filled with challenges within a given time limit (Veldkamp, A., et al., T, 2020). In recent times, edu- escape rooms have gained popularity for incorporating knowledge in a reality based gamified environment and team playing (Yllana-Prieto, F., et al., 2021). Edu- escape rooms can be tailored to impart knowledge on various subjects, including languages, math, science and arts by creating educational settings.

Edu- escape rooms can be designed to align them to the curriculum standards, ensuring that students have fun; as well as reinforcing key learning concepts and skills. Every escape room has a storyline that require players to embody characters or avatars and interact with other players to solve mystical challenges to set themselves free from the room. The challenges are usually in the form of puzzles, riddles or quizzes that gives clues to unlock and move forward within the room. Generally edu - escape rooms are used to provide collaborative learning, team-based methods for social interaction (Bellés-Calvera, L., & Martínez-Hernández, A.-I., 2022, Dugnot-Menéndez, J., et al., 2021) and to foster experiential learning, paving way for creativity, critical thinking and problem solving (Guckian, J., Eveson, L., & May, H., 2020). Over time edu – escape room have evolved to include digital and hybrid formats. This innovative approach to learning not only makes education more enjoyable but also helps to develop essential life skills in a collaborative and dynamic environment.

### **Reviews on Edu - Escape Room in Health Science Education**

There are documented use of health science based edu-escape room in many clinical simulations to enrich the clinical skills. A study among the allied health science students on inter professional skills showed higher scores on the knowledge test administered immediately after the escape room (Fusco, N. M., et al., 2022). An online edu-escape room with science and sustainability contents increase in self-efficacy and more positive attitudes (Flacco, N., et al., 2022). Edu- escape room was identified as an effective tool to implement teamwork and communication concepts in Nursing education (Kutzin, J. M., 2019). Edu-escape to teach key clinical skills along with team work was perceived as a motivational practice by students of Occupational Therapy. Edu- escape rooms have proven to be effective not only in developing soft skills but also in enhancing knowledge in health science core subjects. There are documented effect of better knowledge retention in anatomy among nursing graduates (Molina-Torres, G., et al., 2022). Studies suggest games to be a proven method to stimulate creativity and tap risk taking behaviours which are essential for building leadership qualities (Martínez-Cal, J., et al., 2024).

The language trainers at Health Science colleges can become part takers in imparting knowledge and skills needed for attaining SDGs by creating opportunities for learners to and making a more meaningful English learning sessions. SDG based edu- escape rooms can be an effective tool to sensitize and prepare graduates for attainment of

SDG while enhancing English proficiency. SDG based edu-escape rooms can be developed with language learning objectives combined with challenges to foster problem solving and critical thinking skills to attain SDGs. However, on a review of literature no such SDG based edu - escape rooms were found to be available.

**Objectives:** The aim of the present study was to check the possibility of designing edu- escape rooms to sensitize on SDGs and to investigate the impact of the edu- escape room in mobilizing active participation of Allied Health Science graduates in SDG initiatives.

## **METHODOLOGY**

### **2.1 Designing of SDG based Edu- Escape Room**

The paper gives a sample on how an SDG based escape room can be planned to sensitize and develop student's ability needed to identify the goal and to plan strategies to attain the goal. Here, the *SDG -I 'No Poverty'* based Edu - Escape Room to foster collaboration, critical thinking and decision making skills needed to sensitize and eradicate it was planned out.

*SDG -I on 'No Poverty'* focuses on eradicating extreme poverty, defined as living on less than \$1.90 a day and reducing at least by half the proportion of people living in poverty, according to national definitions. It emphasizes ensuring equal rights to economic resources, access to basic services, ownership and control, over land, and resilience to economic, social and environmental shocks. Achieving this goal requires comprehensive social protection systems, inclusive economic growth, and policies that empower disadvantaged and vulnerable populations ([Goal 1 | Department of Economic and Social Affairs \(un.org\)](#))

**2.1.1 Story line :** The story line is vital to set the mood to play the game as well as to hold all tasks together. A compelling story can captivate students to make learning more memorable. A mission to save or a quest for hidden treasure, the plot should be engaging and relevant to the students' interest and language level.

The outline for the story on the theme of SDG 1 ' No poverty' was generated using the digital AI tool, ChatGPT and localised to suit the participants.

Story Outline; 'You are a team of rural health workers who take charge for health screening among people in a small village near Arunai. You hear news of many recent deaths, find out the mysterious causes for these incidence and take steps to eradicate it.'

**2.1.2. Task Sequential Design:** A linear path design with 3 rooms comprising of one task for each room leading to the other in a sequential manner was created to match with the 3 steps involved in SDG attainment (Fig. 1), converted as a specific SDG objectives to be accomplished.



Fig. 1 Steps in Attaining SDG

**Cottage of Clay**  
 I saw an old cottage of clay,  
 And only of mud was the floor;  
 It was all falling into decay,  
 And the snow drifted in at the door.  
 Yet there a family dwelt,  
 In a hovel so dismal and rude;  
 And though gnawing hunger they felt,  
 They had not a morsel of food.  
 The children were crying for bread,  
 And to their mother they'd run;  
  
 O then, let the wealthy and gay  
 But see such a hovel as this,  
 That in a poor cottage of clay  
 They may know what true misery is.  
 And what I may have to bestow  
 I never will squander away,  
 While many poor people I know  
 Around me are wretched as they.

SDG Objectives: To discover the SDG Goal hidden in the task and identify the correct SDG number.

Instruction: Read the poetry, 'Cottage of Clay' by Jane Taylor's to solve the word challenge, use the cue to find the answers:

W \_ \_ \_ \_ \_ D  
 M \_ \_ \_ \_ L  
 C \_ \_ Y  
 S \_ \_ \_ \_ R  
 H \_ \_ \_ L  
 W \_ \_ \_ \_ Y  
 D \_ \_ \_ Y  
 F \_ \_ \_ R  
 B \_ \_ \_ D  
 M \_ \_ \_ \_ Y  
 D \_ \_ \_ \_ L  
 C \_ \_ \_ \_ E  
 H \_ \_ \_ \_ R  
 B \_ \_ \_ \_ W

Answer for the puzzle:

- |          |             |            |             |
|----------|-------------|------------|-------------|
| Wretched | 2. Morsel   | 3. Clay    | 4. Squander |
| 5. Hovel | 6. Wealthy  | 7. Decay   |             |
| Floor    | 9. Bread    | 10. Misery | 11. Dismal  |
|          | 12. Cottage | 13. Hunger | 14. Bestow  |

SDG Answer :

SDG 1 'No Poverty'

The player will get one of the alphabets of the word 'P-O-V-E-R-T-Y' in a jumbled order. Once the word is identified then the players are asked to say the correct number of the SDG i.e.1, to get the right key from the boxes numbered 1 to 17 to unlock the room.

Task for Room 2 Faces of Poverty

SDG Objectives: To understand the reasons for poverty in Arunai village and identify its and impact.

**2.1.3. Time Duration:** A total of 2 hours, Pretest (10 minutes) Room 1 (20 minutes), Room 2 (30 minutes), 1 (20 minutes), Common debriefing & Post test (10 minutes).

**2.1.4. Tasks:** The tasks in the edu -escape room are generally in the form of puzzles or riddles aligned with the learning objectives. These require the players to solve them to unlock the room. The diverse learning styles and abilities of their students including a variety of puzzles types- such as visual, auditory, and kinetics should be included to ensure that all students can participate and benefit from the experience

AI powered puzzle generators can be used to create customized vocabulary or picture puzzle games related to the topics. Here Super teacher Worksheet generator was used to create the crossword puzzle and an online picture jigsaw creator were used for the same.

[Crossword Puzzle Generator \(superteacherworksheets.com\)](https://www.superteacherworksheets.com)  
<https://www.jigsawplanet.com>

Task for Room 1 Voices of Arunai ( 10 minutes )

Instruction: Visit the site [SDG](#) and complete the online picture jigsaw puzzle in the given time ( 20 minutes - 15 minutes for solving the puzzle and 5 minutes for identifying the causes/ impact depicted)



Answers:

- Image 1 Less Farming Hands (3)
- Image 2 Poor cultivation due to drought (7)
- Image 3 Hunger and Malnourishment due to Famine (9)
- Image 4 Debts that led to Suicide (2)

The reasons/ impacts of poverty pops out as each image is completed along with one of the serial number of the key, 3792 to unlock the room,

Task for Room 3 Uplift

SDG Objectives: To identify strategies to eradicate poverty

Instruction: Read the article, '[Poverty Reduction Strategies in Developing Countries - Outreach International](#)' to complete strategies educate the villagers to improve their farming.

\_\_\_\_\_ that  
produce a lot.  
\_\_\_\_\_ to  
water crop .  
Add

plant	2 . fertilizers	3. add
4. technology	5. loan	
6. better	7. crops	8. use
9 . organic	10. provide	

\_\_\_\_\_ .  
\_\_\_\_\_ programs.

**Answers**

- 1.Plant crops that produce a lot - 1
- 2. Use better technology to water crop -8
- 3. Add organic fertilizers. -3
- 4. Provide affordable loan programs- 10

The key with the number series, '18310' need to be chosen to unlock the door.

**2.1.5. Clues Cards:** Clue cards to guide them in task completion was given to find the key to unlock the door can be creates.

Clue Card for task 1:

Here are the clue for each word. All the words are picked from the poetry.

- In a very unhappy or unfortunate state.
  - A tiny piece or crumb of food.
  - The heavy, earthy material the house was built from.
  - To waste money or resources foolishly.
  - A small, squalid, or "rude" dwelling.
  - People with plenty of money and resources.
  - The process of falling apart or rotting.
  - In this house, it was made of nothing but mud.
  - What the children were crying for.
  - Great distress or discomfort of mind or body.
  - Depressing, gloomy, or dreary.
  - A small, simple house.
  - The "gnawing" feeling felt by the family.
  - To give or present as a gift.
- Note: On every 3 correct answers for the above puzzle you will receive an hint to know the SDG

Clue Card for task 2:

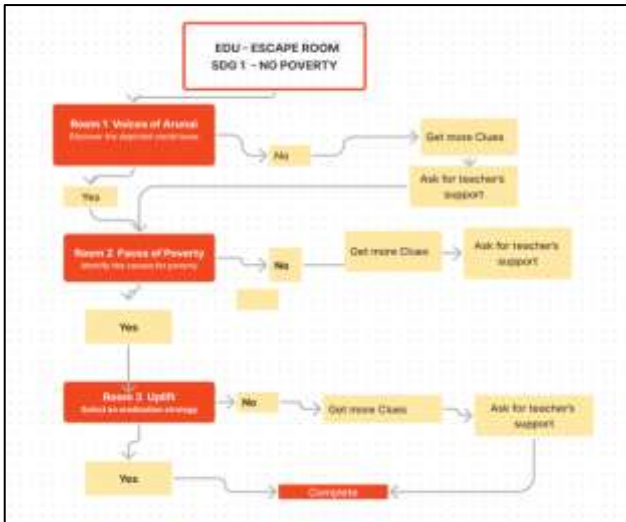
Look at the picture to recreate the same. Guess what reasons are depicted in each image



Clue Card for task 3 : Make use of the words given in the box to make phrases as imperatives. Each of the four strategies has a number of the key to open the door.

**2.1.3. Creating a Escaperoom Pathway:**

Pathway here means how the players will be en-routed to take up the tasks. Below is the sequential structure of how the tasks for the present module will be taken up.



**Fig.2 Pathway Framework of SDG based Edu- Escape room**

**2.2. Implementation**

Eighteen students from undergraduate programme of Pharmacy participated in this study, with 6 students randomly assigned to 3 batches. The first escape room in the sequence was opened to the first batch, followed by a time gap of 20 minutes for the subsequent batches. Each room had a teacher to facilitate the tasks. All three batches completed the tasks in the given time. The effectiveness of SDG based edu - escape room was assessed using a pre and post knowledge test comprising 10 questions on SDG.

**RESULTS**

**Comparison of Pretest and Post test**

A questionnaire comprising of 3 parts, part A with demographic details, part B on the knowledge of goals and Part C on perceived role and responsibility in achieving the goal was created and validated by experts. A 5 point Likert scale ( Strongly Agree -5, Agree - 4, Neither Agree or Disagree - 3, Disagree - 2, Strongly Disagree - 1) was fixed to the Part C to receive their perception. While Part B was made as to choose a single best option. Both the pre and post tests were capture electronically.

**Table.1 Pretest and Post test on perceived role and responsibility in achieving the goal**

Pretest (10)			Post Test (10)			M	P
Me an( n18 )	M edi an	S D	Me an( n18 )	Me dian	S D		
3.3	4	0.13	8.6	6	2.23	5.0	0.01

The comparison of pre and post test on knowledge on SDG 1 'No Poverty' had a mean difference of 5.3 with a p value of 0.001 which shows a high significance.

**Feedback Survey on Students' Perception**

The students' perception on participating in the SDG based edu - escape room was elicited using a feedback survey questionnaire with a set of 10 questions listed below affixed with a 5 point Likert Scale of 5 for Strongly agree, 4-agree, 3 - neither agree nor disagree , 2 -Disagree, 1-Strongly disagree.

**Table 2 Students' Perception on SDG based Edu - Escape Room**

S. N o	Item	M e a n	S D
1	I liked participating in SDG based edu - escape room.	4.96	0.209
2	The edu - escape room was a fun filled way to learn on SDG.	4.96	0.209
3	The edu - escape room encouraged me to think about SDG in a new way.	4.3	1.259
4	I would recommend more of edu - escape room activities in future.	4.96	0.209
5	I could engage freely with my classmates during the edu - escape room.	4.43	0.945
6	The edu - escape room was an effective way to learn on SDG	4.83	0.388
7	I learn better as games than in a didactic lecture.	4.43	0.896
8	The edu - escape room helped me to team well with others	4.83	0.388
9	Solving puzzles were stressful.	1.35	3.027
10	Participating in the escape room was stressful.	1.87	3.344

The participants feedback on the SDG - based educational escape room indicates very high levels of acceptance, motivation, engagement, collaboration, perceived learning effectiveness, critical thinking and low stress perception.

Items ( no 1, 2 and 4) related to motivation recorded high mean scores ( M = 4.96, SD = 0.209), indicating strong agreement among participants. Learners reported that they enjoyed participating, found the escape room fun-filled, and expressed a strong willingness to recommend similar activities in the future. The low standard deviation reflects consistent positive perceptions across participants highlighting the escape room as a highly motivating learning strategy.

Engagement ( item no. 5) during the activity was also rated positively ( M= 4.43, SD= 0.945). Participants felt they could engage freely with classmates, suggesting that the

escape room environment supported active participation and peer interaction. The moderate SD indicates some variability, possibly reflecting individual differences in comfort levels with collaborative activities.

Collaboration outcome ( item no.8)was rated high ( M= 4.83, SD=0.388) . Participants strongly agreed that the escape room helped them work effectively as a team. The agreement among learners, emphasizing the activity's effectiveness in fostering teamwork and cooperative problem solving.

The perceived learning effectiveness ( item no. 6 &7) was notably strong. Participants agreed that the escape room was an effective way to learn about SDGs (M= 4.83, SD = 0.388) and that they learned better through games than lectures. These findings suggest that game - based learning approaches can enhance understanding and retention of complex concepts such as SDGs.

The escape room has encouraged participants to critically think ( item no 3 ) about SDGs in a new way (M= 4.30, SD = 1.259). The puzzles that require solving skills may have strongly allowed them to utilize their critical thinking skill. Items no 9 and 10 show low mean score ( M= 1.35, SD = 3.027) for stress caused by the activities and for participation in the escape room was also rated as minimally stressful (M = 1.87, SD = 3.344). These results indicate that despite being cognitively engaging, the escape room did not create undue stress, supporting its suitability as a learner - friendly instructional strategy.

## DISCUSSION

The study observed a significant effectiveness in imparting knowledge on SDG using edu - escape room. The improvement in the knowledge was in alignment (P - value of < 0.001) with that of the study by López-Pernas, Sonsoles, et al.,(2019) who imparted knowledge on web development using escape room among the graduates of Telecommunications Engineering.

Shah, Ashish S., et al., 2023) identifies that there is a gap in educator's knowledge on designing puzzles related to specific learning objectives which could be anxiety provoking and be challenging in designing an escape room, however, in our study we have sought the assistance of AI tools to successfully overcome this challenges.

Game based learning improves students' learning performance and motivation (Küçük Yüceyurt, Nil, and Merve Altiner Yaş, 2025 ; Kavanaugh, R., et al., 2020). Edu escape is attainment of educational goals through a game based learning. An virtual escape room that mimicked the Next Generation NCLEX testing platform had 91 percent of the participants say that they preferred the game format more than the lecture format( Scott, Georgianna, et al, 2024). In our present study a clear positive attitude towards participation in SDG based Edu - Escape room activities was shown by the majority of the participants. Many considered it a thrilling and a highly enjoyable activity. A study using games based SDG teaching pedagogical module have shown that designing educational games shaped

students' creativity, collaboration, critical thinking, global awareness, and digital agency ( Li, Yingji, and Jingyi, 2025 ; Moore, L., & Campbell, N., Wang, 2021). Unlike physical puzzles, cognitive puzzles are the key probe for critical thinking, the complexity of the puzzles can be increased or decreased by giving variation in the level of difficulty, path way organised to resolve them and time to complete it ( Veldkamp, Alice, et al.,2020) . In our study also participants perceived deciphering solving puzzles, analysing the scenario to tap their critical thinking.

## CONCLUSION

The present study could be the first of its kind in conceptualizing SDG based edu - escape room. The clear step- wise frame shown through this sample module could definitely give an idea on how teachers can create an experiential learning atmosphere in their classes. Edu – escape rooms appeal to various learning styles, offering visual, auditory and kinaesthetic elements that can help in reinforcing concepts more effectively. Additionally they provide immediate feedback, allowing students to understand their mistakes and learn from them in real –time. This hands-on –approach not only deepen understanding of SDG but also fosters a positive attitude towards building essential skills, making education an interactive and enjoyable experience. By incorporating team work and problem solving the teachers can enhance critical thinking, collaborative and communication skills.

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