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An Evaluation Of The Enjoyment Levels Of Participants Of LifeLab, A Health Literacy Intervention For Socially Disadvantaged Adolescents.

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Cover Page Footnote

I would like to acknowledge Michelle Noonan, Tara Kelly and Mick O'Toole who worked alongside me in the creation of the enjoyment scales and the collecting of data from focus groups as part of our final year project. I would also like to thank all the students and teachers for their participation in LifeLab and this research project.

An evaluation of the enjoyment levels of participants of LifeLab, a health literacy intervention for socially disadvantaged adolescents.

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Abstract

Aim: LifeLab is co-designed by and for Junior Cycle students from social disadvantage in Ireland, with the hope to improve health literacy and subsequent health outcomes in this cohort. The aim of this study was to evaluate the enjoyment levels of students participating in the pilot of LifeLab, with a view to informing future development of the intervention.

Method: As part of the process evaluation of the pilot of LifeLab, a series of focus groups and purposively designed enjoyment scales were completed by 80 adolescents, from one disadvantaged school in Dublin, Ireland. Inductive thematic analysis was carried out to analyse focus group data, and descriptive analysis of the enjoyment scales was conducted. Findings of the focus groups and enjoyment scales were synthesised and integrated resulting in the generation of a series of higher order and lower order themes of enjoyment.

Results: Results of the inductive thematic analysis identified barriers, facilitators and suggestions for increasing enjoyment. Adolescents' enjoyment of the LifeLab intervention can be improved through the integration of fun activity-based learning, competition, variety, and challenge.

Conclusions: Findings suggested specific areas of improvement within the intervention, and by using the participant voice, these factors can be incorporated within the LifeLab intervention. It is hoped these refinements, as part of ongoing intervention development, may increase levels of enjoyment, which will therefore enhance the usability and success of LifeLab.

1. Introduction

Health literacy first came into discussion around the 1970's, where it was referred to as social policy (Simonds, 1974). Over the years, the definition of health literacy has become more specific. Health literacy involves a person's knowledge, motivation and competencies to access, understand and use information (Sørensen et al., 2012), thus helping people to make judgements and decisions in everyday life concerning healthcare, disease prevention and health promotion. This allows individuals to maintain and improve their quality of life throughout the lifespan (Sørensen et al., 2012). Health literacy studies have shown the impact of health literacy on health outcomes (Al Sayah et al., 2013; McDaid, 2016; Fleary et al., 2018). The consequences of limited health literacy may include poor self-management skills (Schillinger et al., 2002), high morbidity rates (Moser et al., 2015), high mortality rates (Sudore et al., 2006) and poor medication adherence (Gazmararian et al., 2006). All of which can lead to increased hospitalisation and healthcare costs, increased frequency of chronic conditions and reluctance to use preventative services or measures (Marshall, Sahn and McCarthy, 2012).

Research has shown that if young people receive support in developing and improving health literacy, subsequent benefits track into adulthood. (Fleary et al., 2018; Caldwell and Melton, 2020). Research exploring the health literacy of adolescents in Europe demonstrated a link with self-reported health and the influence of family affluence (Paakkari et al., 2020). This link between health literacy and socioeconomic status (SES) is shown in adult populations (Doyle, Cafferkey and Fulham, 2012), but further research has been called for to explore and understand the broad range of factors influencing health literacy. In Ireland however, there remains very little data on health literacy of teenagers. Initial research by Goss et al., (2021) found that adolescents from socially disadvantaged areas in Ireland face many health issues that can influence immediate and long-term health outcomes, and face many barriers in developing higher levels of health and health literacy. More broadly, findings from the 2018 Health Behaviour in School- aged Children Ireland study, which surveyed 62,720 school children between the ages of 10 and 17, reported that 19% of participants had been drunk, 5.3% smoked tobacco and 8.5% used cannabis within the previous year (Költő et al., 2020). Further longitudinal data in Ireland has shown that students in disadvantaged schools demonstrate higher levels of obesity and being overweight, which continues to progress as students get older

(Bel- Serrat et al., 2017). This relationship indicates a need to focus on teenagers from low-SES to improve health literacy and health outcomes in this cohort.

In Ireland, there is a specific DEIS (Delivering Equality of Opportunities in Schools) initiative which forms part of the action plan for educational inclusion. It was launched by the Department of Education and Skills in Ireland, in May 2005. 852 Primary Level and Second Level Schools in Ireland are included in the DEIS initiative. It works with young people from disadvantaged communities with the aim of lessening educational disadvantage and bringing about social inclusion. Regardless of their status, schools have been highlighted as a context for health related interventions as they come into contact with large numbers of young people, on a regular basis and across all development stages, where lifelong health habits may be established (Waters et al., 2015). As adolescents, students spend much of their time engaged in school related activities. Schools can incorporate prevention programmes to meet their psychosocial, emotional, cognitive and behavioural needs (Fox, 2010; Maziak, Ward and Stockton, 2008; Wisner and Starzec, 2010). Schools are naturally positioned at the forefront for any positive mental or physical health promotion programmes (O'Reilly et al., 2018) for example the Well-being programme in Ireland. Alleviating many typical barriers to interventions such as stigma, time, location and cost (Barret and Pahl, 2006). It is therefore a good potential site for any health interventions. In Ireland, one example of this is the introduction of 'Wellbeing' within Junior Cycle. The Wellbeing framework aims to support a variety of areas of students' wellbeing, one of which could be health literacy (NCCA, 2021).

Research has demonstrated that focusing interventions on health behaviours can increase health literacy (Taggart et al., 2012). Furthermore, interventions set in school settings have shown to be an effective way to promote healthy behaviours (Laine et al., 2014). McDaid (2016) reported the importance of effective health literacy interventions and their positive impact on education, leading to long term life benefits. One key finding was that by improving health and education in schools, there is an increased possibility of greater economic benefits for children once they reach adulthood. Smith et al., (2021) completed a recent systematic review that highlighted the need to integrate practical based learning activities and peer educators within a successful intervention. Establishing sustainable and feasible programmes in schools can be very challenging, but well-structured and well-designed programmes will be more likely to be accepted by schools (Mace, 2008). Many schools face practical challenges, such as limited time in the school day, curriculum limitations, decreasing availability of funds and lack of trained

staff (Broderick, 2014) which can affect the feasibility and effectiveness of intervention programmes.

Psycho-social factors, such as enjoyment, are important to consider as a mediator and a predictor of health behaviour change and intervention feasibility (Van Cappellen et al., 2018), with the development of intrinsic motivation being the ultimate goal for many of these interventions (Gillison et al., 2019). The positive affective processes that underpin positive health behaviour change are not fully understood (Van Cappellen et al., 2017) perhaps leading to the enjoyment levels of those participating in interventions to be overlooked. In an educational context specifically, research has shown that when students enjoyed learning a topic, they were more likely to want to continue learning (Ainley and Ainley, 2011). Furthermore, in a recent systematic review of health-related interventions aimed at disadvantaged adolescents, perceptions of enjoyment were an important factor in effective interventions (Smith et al., 2021), and therefore warrants further exploration.

As part of a wider project, this paper explores an example of a health literacy intervention: LifeLab. LifeLab is a health literacy intervention aimed at disadvantaged adolescents. It focuses on sleep, physical activity, mental health, social and environmental factors that influence health, substance misuse and food choices. In order to design personally meaningful and socially relevant interventions for adolescents, adolescent views, opinions and insight regarding motivation and barriers they experience in relation to the topic both within and beyond school must be sought (Belton et al., 2014). The primary focus of LifeLab is to develop the health literacy levels of DEIS students. LifeLab sets out to make students aware of health literacy and to break the “health inequality” which has shown to emerge early in life (Bel-Serrat et al., 2017). Previous studies done on Lifelab have formatively evaluated and co-designed future content for Lifelab. Smith et al., (2022) evaluated the acceptability and efficacy of the intervention. The aim of this study is to evaluate the enjoyment levels of students participating in this intervention.

2. Materials and Methods

2.1 Participants

Dublin City University Ethical approval was granted for this study by the institutional ethics committee [DCUREC/2021/192]. One disadvantaged school was contacted and invited to

express an interest in participating in the study. The school was invited based on the need to ensure a mixed gender, DEIS urban school, from Ireland. Upon principal consent to school involvement, all first-year students were invited to take part (ages 12-14 years old). A total of 80 adolescents, (n= 40 females, n=40 males) provided informed consent and were present on the days of data collection. School and parental informed consents and participant assent were obtained prior to participation.

2.2 Procedure

LifeLab is hosted at Dublin City University. Over a four-week period, four classes attended a LifeLab session. In each session, students were split into five groups, with a maximum of five students per group. Groups then took part in a circuit of five stations (see *Figure 1: Descriptions of Stations* below for further details) focusing on physical activity, mental health, food choices, sleep and the social and environmental factors influencing health. Each station was approximately 15 minutes and had an undergraduate student facilitator present to explain and guide students throughout the activity.

Table 1: Descriptions of Stations.

Station:	Description:
Physical Activity	Students participate in a game of giant snakes and ladders, the outcome of each turn resulting in the students having the choice of playing a variety of physical activity games (dance mat, reaction wall, golf, target wall and balance beam) or answering a question related to physical activity.
Mental Health	Students engage in a discussion about mental health. Students come up with barriers of mental health, which they will write on the structures inside the octagon board. For each barrier they come up with, they generate two or three tools/life skills to help them overcome these barriers, which they then write on the sides of the octagon board. As a team, students tilt the board to manoeuvre a ball to hit a barrier, a tool

	to overcome this barrier and then get the ball in the hole. The hole leads to a mental health toolbox which gathers all the tools which students can use to tackle mental health.
Sleep	Students are divided into two groups, two scientists and three participants. Each participant is placed in three different environments: relaxation zone, stressful zone and gaming zone. The participants are 'hooked up' to a device that measures their 'live' brain activity. The scientists analyse the brain waves on the computer in the lab. Students then generate ideas on how they could improve sleep hygiene and sleep quality.
Food	Students engage in a discussion about two vignettes (Jay and Lauren) on the topic of food choices and their food diaries. Students answer questions on the food diary in two teams and engage in a discussion with each other on their answers. Students view the amount of sugar in certain drinks in the form of a worksheet and answer questions on the topic of energy drinks etc.
Social and Environmental Factors	Students take part in a game of 'Who wants to be a Millionaire'. The questions focus on social and environmental factors related to health at present. Students are divided into two teams and must buzz in if they know the correct answer. The team with the most money at the end of the game wins.

Immediately following each station, students were asked to rate their perceived level of enjoyment on the enjoyment scale before rotating to the next station. The enjoyment scale had 5 levels, 'Very Enjoyable', 'Enjoyable', 'It was okay', 'Not enjoyable', and 'Really didn't like it'. An A3 sized print out of the enjoyment scale question was printed and displayed at each station. At the end of the station each participant was given a coloured sticker to place on the enjoyment scale to indicate the extent to which they enjoyed the activity. During the data

processing, these five categories were then collapsed into three, 'enjoyable', 'it was ok' and 'not enjoyable' to simplify the process.

At the end of the session, all participants took part in a number of focus group. The purpose of the focus groups was to identify and explore reasons why students either did or did not enjoy the LifeLab intervention. This information gave an in-depth insight into the views of adolescents in this project. A semi-structured focus group guide, developed by an experienced research team, was used. This guide included questions designed to evaluate students' enjoyment of the intervention. Roughly three focus groups per week, with the students divided evenly among the groups, on average there were 6 students per group. The focus groups were led by members of the research team and lasted around ten to fifteen minutes. All focus groups were recorded using a Dictaphone and transcribed verbatim.

Inductive reflexive thematic analysis was used to analyse the focus groups (Braun and Clarke, 2006; 2019). This involved; familiarisation with data, coding, generating initial themes, reviewing themes, defining and naming themes and writing up (Clarke and Braun, 2018). This approach was used as it allowed the research team, to identify patterns of meaning in the qualitative dataset that was gathered (Braun and Clarke, 2006). The data was coded using an inductive approach to develop themes and subthemes from the dataset. The use of inductive analysis ensures that the themes developed originate from the data collected (Patton, 1990; Ibrahim, 2012). In this sense, this type of topical investigation is information driven (Clarke and Braun, 2018).

Findings from both focus groups and enjoyment scales were synthesised and integrated together resulting in the generation of a series of higher order and lower order themes of enjoyment.

3. Results

3.1 Focus Group

The thematic analysis brought to light three higher order themes related to enjoyment. 'Facilitators' 'Barriers' and 'Suggestions for Future Practice'. Within these higher order themes, lower order themes were also identified (see Table 2.).

Table 2: Higher and lower order themes of enjoyment.

Higher order themes of enjoyment	Facilitators	Barriers	Suggestions for Future Practice
Lower order themes of enjoyment	Activity - based learning	Boredom	Time
	Competition	Lack of time	Competition
	Variation	Lack of challenge	

3.1.1 Facilitators

The main facilitators identified from the focus groups include *activity-based learning*, *competition*, and *variation*. The data showed that students found the stations more enjoyable when they included an aspect of *active learning*. For example, one student said, “Like the activities were fun” and another student said they enjoyed it because “It was physical”. *Competition* was another key component of making the stations more enjoyable with students saying, “It’s good to have competition” and “Yeah. It is motivation to get the answers right.” Students also identified that *variation* was an important aspect of the stations that made them more enjoyable as they “liked the different activities”.

3.1.2 Barriers

The barriers identified from the focus groups include *boredom*, a *lack of time* and a *lack of challenge*. The data showed that students did not enjoy some of the stations as they found them to be boring, whilst also referring to certain stations as not interesting. One participant described the food choices station by stating “I just didn’t find it interesting”. Another aspect that was identified was the *lack of time* participants had to spend on the stations. Participants identified this as a barrier in stating “I didn’t have enough time on the ones I liked” and “We didn’t have enough time, so we didn’t know how to do it”. Additionally, some tasks in the Physical Activity station, and Social and Environmental factors that influence health station were described as too easy and not posing enough challenge for the participants. This was identified when one participant stated, “So like when a team goes first you have so much time to think of the answer like it makes it easier”. Another participant described the need for “Everyone agreed that they

like it when things are a bit challenging.” This feedback highlighted the final minor theme under barriers, *lack of challenge*.

3.1.3 Suggestions for Future Practice

In the focus groups, students came up with suggestions as to what they think would make the LifeLab Intervention more enjoyable. Two lower order themes were *time* and *competition*. Students wanted elements of the intervention to be “more competitive”. One student said, “Another thing you could do is like everyone’s against each other...”, referring to the Social and Environmental factors that influence health station. Students also stated that the activities were “very short” and that “more time in LifeLab” would help in making it more enjoyable. One student commented that they “Could have spent at least five more minutes, maybe twenty minutes on some of them”.

3.2. Enjoyment Scales

Table 2: Enjoyment Scale Percentages Table

Station:	Enjoyable	It was ok	Not Enjoyable
Sleep	66.25%	13.75%	20.00%
Food Choices	67.50%	22.50%	10.00%
Mental Health	68.75%	22.50%	8.75%
Social and Environmental Factors that Influence Health	88.75%	7.50%	3.75%
Physical Activity	90.00%	8.75%	1.25%

The enjoyment scales highlighted explicitly which stations needed further development. It is clear from the scale responses that the sleep station was the least enjoyable for the students, with 20% indicating it was not enjoyable (Table 2). The food choices and mental health station also displayed lower standards of enjoyment. The social and environmental factors that influence health and the physical activity station showed higher levels of enjoyment among the students, however there is still room for improvement. This information, taken with the views of the participants gathered in the focus groups, identifies specific areas of the LifeLab intervention that can be improved.

4. Discussion

The aim of this project was to evaluate the enjoyment levels of students participating in LifeLab, a health literacy intervention created for junior cycle DEIS students in Ireland. In this study, thematic analysis brought to light *barriers* and *facilitators* as higher order themes of enjoyment in the LifeLab intervention as well as *suggestions to improve enjoyment* for students participating in LifeLab.

One lower order theme that was categorised under *facilitators* to enjoyment was *competition*. Students described stations they enjoyed as “*It was just funny and competitive*”. When analysing the data, students suggested ways of increasing competition within the stations as a way of making the activity more enjoyable “*Like, try to be like, competitive*”. In a similar study, McCarthy, Jones and Clark-Carter (2008), showed that competitive excitement significantly predicted enjoyment among older children correlating with the results of this study. Laws and Fisher (1999), highlighted that a key source of enjoyment derives from intrinsic non-achievement factors such as competition, correlating with this result. Studies have shown that teenagers enjoy the challenge that comes with competition (Jakobsson, 2014). In response to the above comments, we should be aiming to include a competitive element into the stations of LifeLab. By making the stations within LifeLab more competitive, it will increase the enjoyment levels for students.

Active learning was another lower order theme that should be considered to further develop LifeLab. One student justified why they enjoyed a station by saying “*It’s telling you stuff about mental health and how you can deal with it*”. Another student suggested “*Maybe more like*

interactions, because all you were doing was writing down stuff, all the other ones we were actually like seeing stuff, interacting with stuff”, as a way of improving the food choices station specifically. Previous studies have shown that students enjoy an interactive aspect within learning, supporting findings from the current study (Mio et al., 2019). Adapting LifeLab to involve more active learning will hopefully capture the attention of participants. It is vital that students are focused throughout the stations as this will ensure maximum learning potential.

The final lower order theme that emerged from the data was *variation*. Students enjoyed stations more where there were options of activities *“They were all different”*. Several suggestions from the students were to increase the options available within stations. One student said, *“Add more options for the snakes and ladders”*. Previous findings that support this result, highlighted that a variety of physical activity forms influences enjoyment levels of participants (How et al., 2013). Increasing variation within LifeLab should keep students engaged throughout the stations. LifeLab should aim to give the students a voice and a choice.

Overall, a minimum of 66% of participants said they enjoyed each station. However, there was a drastic increase in enjoyment levels for stations that included aspects of *active learning, competition and variation*. The Physical Activity station which included all three, had 90% (n=72) of participants enjoying the station with only 1.25% (n=1) not enjoying the activity, further justifying the findings of this study.

In contrast, several students said *“I just found it boring”* when asked to explain why they did not enjoy certain stations. Students gave ideas of how to overcome this issue such as *“Like have a little game”*. A study by Whitehead (1993), supported that reducing boredom increases adherence, while more recent research has also supported this, showing an inverse relationship between boredom and enjoyment (Obergruesser and Stoeger., 2020). It is critical that the students' opinions about LifeLab being boring are listened to and that stations are adapted accordingly in order to maximise enjoyment for participants.

Students also found the *lack of challenge an issue, with students stating “It was too easy”* for some stations, and suggesting that others needed *“More of a challenge”*. Previous findings that support this include a study completed by Subramaniam and Silverman (2007) in which they found a relationship between the decrease in enjoyment levels of students in PE lessons due to

boredom, stemming from lack of challenge. Dismore and Bailey (2011) also suggested that fun is less about playing games and more about challenge and learning in older students, which is particularly relevant to the age group in the current study. Studies have shown that challenge plays an important role in engagement and fun for students (Beni, Fletcher and Ní Chróinín, 2017). This links back to the desire for a competitive element requested by the students. However, LifeLab must keep in mind the different abilities within groups and differentiate accordingly to ensure all students are catered for.

Lack of time was a further lower order theme that emerged under *barriers* to enjoyment. Students also spoke of *lack of time* as a barrier to enjoyment; “We *didn't* have enough time, so we *didn't* know how to do it”. There were a lot of suggestions around increasing the duration of stations “Probably make each like, station a bit longer, five minutes longer or something.” Research has shown that sufficient time is required for students to progress from lower concrete levels to higher, abstract levels. From learning the rules, to interpreting the game as a theoretical conceptualization of the content area (Kolb, 1984; Laveault and Corbeil, 1990). Other authors have also reported that without this, students become frustrated, resulting in decreased motivation and enjoyment (Charsky and Ressler, 2011). There is a need to review the content within each station of LifeLab, to ensure there is adequate time for the workload to be covered.

From the results and supporting research it is hoped that by implementing these suggested changes within LifeLab, it will enhance the overall experience and learning achieved within the intervention. By increasing enjoyment levels for students participating in LifeLab, it will encourage them to fully immerse themselves in the experience, and this will hopefully lead to improvements in health literacy and health outcomes, both of which need further study to evidence. As well as this need to further research the wider effectiveness of LifeLab, there are specific limitations of the current study. Whilst the intervention school was DEIS, this does not necessarily mean that all participants would identify as being from a disadvantaged background, however this is a widely accepted means of qualifying and accessing this cohort and it was beyond the scope of the study to categorise this status further. It was also beyond the scope to collect further demographic information such as age and gender, which wider research has shown may impact HL levels. This was a cross-sectional study, with classes participating in LifeLab over a four-week period, there are therefore many extraneous factors that could have impacted findings. This study was also impacted by COVID-19, the wearing of masks may have

impacted the enjoyment of some participants, and some students were unable to attend with their normal class due to school absences (although they were offered the opportunity to attend at a later date). It should also be noted that this study was part of a case study pilot, and therefore the sample was solely first year students from one DEIS school, with a view to inform the future development of the LifeLab intervention, although findings maybe transferable to other contexts. The data collection was done in group settings. This was done for convenience and lack of time. However, this may have compromised results slightly.

5. Conclusions

The aim of this study was to evaluate the enjoyment levels of students participating in LifeLab. It is clear from this study that in order to fully engage our students in the process of LifeLab, we must fully embed a competitive element along with variation and active learning within the stations. The impact of these findings will directly inform the iterative development of LifeLab, but can also inform other health related education programmes in similar contexts. LifeLab aims to be an enjoyable experience for participants. The hope is that by creating an enjoyable environment for students, LifeLab can maximise learning and that students will be more inclined to support and return to LifeLab in the future. The results of this study highlight existing areas of enjoyment within the intervention for students. This study also pinpoints areas within LifeLab that need to be readjusted to maximise enjoyment for participants. LifeLab has been co-developed to increase health literacy levels of adolescents participating in the intervention, but it is crucial that we continue to hear what participants are saying and react appropriately to guide future refinements.

6. Future Work

Based on the results of this study, the following recommendations can be made:

1. The recommendations suggested in this study should be implemented into future LifeLab iterations, and further evaluation of the impact of these changes is needed.
2. Future research could investigate possible gender differences in relation to enjoyment levels within LifeLab.

3. The enjoyment levels of older students participating in LifeLab could be examined and compared.
4. A larger scale study could be completed, looking at the enjoyment levels of students participating in LifeLab, involving multiple DEIS schools from different areas around Ireland.

7. Acknowledgements

I would like to acknowledge Michelle Noonan, Tara Kelly and Mick O'Toole who worked alongside me in the creation of the enjoyment scales and the collecting of data from focus groups as part of our final year project. I would also like to thank all the students and teachers for their participation in LifeLab and this research project.

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