



DATA NOTE

REVISIED Development and application of a learning enjoyment scale for pedagogical activities [version 2; peer review: 2 approved]

Tarig Merghani ¹, Rasha Babiker ¹, Azza O. Alawad²

¹Physiology, RAK Medical and Health Sciences University, Ras Al-Khaimah, 11172, United Arab Emirates

²Physiology, Al-Neelain University, Khartoum, Sudan

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Abstract

The impact of learning enjoyment on motivation, enthusiasm, and overall learning experiences is significant. Previous studies, lacking an unbiased tool for measuring enjoyment and confronting various influencing factors, produced conflicting results regarding enjoyment levels in different instructional methods. Hence, we developed a learning enjoyment scale for evaluating both active and passive educational activities. We applied the developed scale to 112 first-year medical and dental students to assess their enjoyment during didactic physiology lectures and explored possible associated factors. Within this data note, we present students' responses to the developed LES. The LES encompasses six dimensions: knowledge, comprehension, application, analysis, concentration, and enjoyment. Students provided ratings for each dimension on a five-point Likert scale, spanning from 1 (strongly disagree) to 5 (strongly agree). The cumulative scores across the six dimensions range from a minimum of 6 to a maximum of 30. These total scores can be categorized as excellent (> 24), acceptable (18-24), or low (< 18). The second section of the dataset examines specific factors influencing overall enjoyment, such as teacher proficiency, topic difficulty, active student participation, objectives fulfillment, low stress levels, and self-perceived acquisition of skills. In addition to objective measurement of students' enjoyment level, the LES can be utilized for quantitative cross-comparisons between different teaching activities. By employing this dataset, we will undertake an analysis to determine the internal consistency of the Learning Enjoyment Scale (LES), with the anticipation that the outcomes will be published in another venue.

Open Peer Review

Approval Status

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1. **Tarig Fadelelmoula** , National University of Science and Technology, Muscat, Oman
2. **Mohi Eldin Magzoub**, United Arab Emirates University, Al Ain, United Arab Emirates

Any reports and responses or comments on the article can be found at the end of the article.

Keywords

Pedagogical Activities, Learning Enjoyment Scale, Teaching Methods, Didactic Lectures, Teacher Proficiency

Corresponding author: Tarig Merghani (tarig@rakmhsu.ac.ae)

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Competing interests: No competing interests were disclosed.

Grant information: The author(s) declared that no grants were involved in supporting this work.

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REVISED Amendments from Version 1

In the revised version we updated the introduction, acknowledged previous efforts of educators in measurement of enjoyment level and clearly stated the objectives of our study. In the methods we explained the rationale of using Likert scale and the cutoff points used for categorization of enjoyment level into three categories, excellent, acceptable and low.

Any further responses from the reviewers can be found at the end of the article

Introduction

The ongoing discourse on the effectiveness of teacher-centred learning approaches (passive instruction) versus student-centred learning methods (active instruction) persists, despite numerous studies conducted over the past three decades. Traditional lectures have been consistently criticized for their perceived lack of student engagement, largely due to their reliance on passive one-way information delivery. Students often view didactic lectures as dull or ineffective¹⁻³ when compared to the active learning approaches. Consequently, many educators have embraced strategies such as incorporating real-life scenarios,⁴ introducing games,⁵ utilizing technology,⁶ or integrating problem-solving elements⁷ to enhance the enjoyability of their lectures. However, the challenge persists, as there are no universally clear guidelines on how to structure lectures that are both educational and enjoyable.

Student Enjoyment is a state of psychological happiness experienced during learning. It is nicely defined by Hartley as the pleasant emotional state of the learner that develops during an educational activity due to experiencing a positive situation that motivates the learner to complete the task to persevere this feeling.⁸ Although it is different from engagement, satisfaction or motivation, the combination contributes to a positive and effective learning atmosphere, fostering academic success and passion for knowledge.^{9,10}

Students' enjoyment may be influenced by various factors, including but not limited to the instructor's skill, the nature of the topic, and the educational environment. Furthermore, the diverse personalities and learning styles of students all contribute to and impact the level of enjoyment experienced during a teaching activity.¹¹⁻¹³

Due to the intricate nature of these variables and the significance of enjoyment in the learning process, there is a pressing need for an objective measurement tool to gauge students' enjoyment across various teaching activities. Such a tool would not only streamline the assessment of diverse teaching methods but also aid in pinpointing the factors contributing to fluctuations in enjoyment levels within the same teaching method when presented by different instructors or for different subjects by the same faculty. Many educators tried different methods for measuring level of enjoyment during learning activities, ranging from a single question rating (for example from 0 to 6),¹⁴ to different types of questionnaires such as satisfaction questionnaire with open ended questions,^{15,16} adapted items from Achievement Emotions Questionnaire¹⁷ and researcher-prepared questionnaire based on enjoyment indicators.¹⁸ In this study, our primary objective is to develop a comprehensive learning enjoyment scale (LES) for the evaluation of both active and passive teaching activities. We applied the developed scale to 112 first-year medical and dental students, evaluating their enjoyment during didactic Physiology lectures and investigating potential associated factors. This data note presents the students' responses to the developed LES. Our newly created scale, coupled with the associated dataset,¹ provides valuable insights into the nuances of student enjoyment, offering a tool that transcends the conventional dichotomy of teaching methods and delves into the factors shaping students' learning experiences.

Methods

We developed the Learning Enjoyment Scale (LES) as a comprehensive and objective tool for measuring students' enjoyment in the learning process, [Figure 1](#).¹ The scale items are strategically aligned with the major categories of Bloom's Taxonomy, emphasizing cognitive knowledge and affective attitude. Furthermore, the third domain, psychomotor skills, is partially assessed in the second section of the scale, highlighting its role as part of the overall enjoyment attributes. The LES first section consists of six items: knowledge, comprehension, application, analysis, concentration, and enjoyment. Students are instructed to rate each item on a five-point Likert scale, ranging from 1 to 5 (1 = strongly disagree, 2 = disagree, 3 = unsure, 4 = agree, and 5 = strongly agree). The minimum and total scores across the six items amount to 6 and 30, respectively. An excellent score is defined as above 80% (25-30), an acceptable score falls within the range of 60-80% (18-24), and a low score is considered less than 60% (<18). The 5-Likert scale selection and categorization into excellent, acceptable, and low is justified by its ability to provide clear interpretations of students' enjoyment levels. In addition, the thresholds (60% and 80%) align with educational standards commonly used to assess performance and satisfaction levels in various academic contexts.

The Learning Enjoyment Scale (LES)									
A. LES items									
1- I remember most of the new information taught in this teaching activity									
Strongly disagree	<input type="checkbox"/>	Disagree	<input type="checkbox"/>	Unsure	<input type="checkbox"/>	Agree	<input type="checkbox"/>	Strongly agree	<input type="checkbox"/>
2- I understand most of the information given during this teaching activity									
Strongly disagree	<input type="checkbox"/>	Disagree	<input type="checkbox"/>	Unsure	<input type="checkbox"/>	Agree	<input type="checkbox"/>	Strongly agree	<input type="checkbox"/>
3- I feel confident to apply the information I learned in this activity									
Strongly disagree	<input type="checkbox"/>	Disagree	<input type="checkbox"/>	Unsure	<input type="checkbox"/>	Agree	<input type="checkbox"/>	Strongly agree	<input type="checkbox"/>
4- I feel confident to analyze and evaluate problems related to the information given during this teaching activity									
Strongly disagree	<input type="checkbox"/>	Disagree	<input type="checkbox"/>	Unsure	<input type="checkbox"/>	Agree	<input type="checkbox"/>	Strongly agree	<input type="checkbox"/>
5- I followed most of the teaching activity with interest									
Strongly disagree	<input type="checkbox"/>	Disagree	<input type="checkbox"/>	Unsure	<input type="checkbox"/>	Agree	<input type="checkbox"/>	Strongly agree	<input type="checkbox"/>
6- I enjoyed the teaching activity									
Strongly disagree	<input type="checkbox"/>	Disagree	<input type="checkbox"/>	Unsure	<input type="checkbox"/>	Agree	<input type="checkbox"/>	Strongly agree	<input type="checkbox"/>
B. Enjoyment Attributes									
7- The teacher is talented in teaching									
Strongly disagree	<input type="checkbox"/>	Disagree	<input type="checkbox"/>	Unsure	<input type="checkbox"/>	Agree	<input type="checkbox"/>	Strongly agree	<input type="checkbox"/>
8- The topic contents are easy									
Strongly disagree	<input type="checkbox"/>	Disagree	<input type="checkbox"/>	Unsure	<input type="checkbox"/>	Agree	<input type="checkbox"/>	Strongly agree	<input type="checkbox"/>
9- I was able to participate									
Strongly disagree	<input type="checkbox"/>	Disagree	<input type="checkbox"/>	Unsure	<input type="checkbox"/>	Agree	<input type="checkbox"/>	Strongly agree	<input type="checkbox"/>
10- The learning objectives were fulfilled									
Strongly disagree	<input type="checkbox"/>	Disagree	<input type="checkbox"/>	Unsure	<input type="checkbox"/>	Agree	<input type="checkbox"/>	Strongly agree	<input type="checkbox"/>
11- I was relaxed and not stressed									
Strongly disagree	<input type="checkbox"/>	Disagree	<input type="checkbox"/>	Unsure	<input type="checkbox"/>	Agree	<input type="checkbox"/>	Strongly agree	<input type="checkbox"/>
12- I am satisfied with the skills I gained during the practical part of this teaching activity									
Strongly disagree	<input type="checkbox"/>	Disagree	<input type="checkbox"/>	Unsure	<input type="checkbox"/>	Agree	<input type="checkbox"/>	Strongly agree	<input type="checkbox"/>

Figure 1. The learning enjoyment scale.

The second section of the LES evaluates the impact of various factors on students' enjoyment. These factors encompass the teacher's talent or proficiency, the complexity of the topic, student participation, objectives fulfillment, perceived stress levels, and the development of skills. Through direct analysis, the contribution of each factor to the overall LES is determined, offering a detailed understanding of the specific elements influencing students' enjoyment during the learning process. The scoring system of the LES questionnaire aims to provide a quantitative assessment of the multifaceted aspects contributing to students' enjoyment in educational settings.

The provided dataset represents students' responses to the items of the developed scale. The data was collected from first-year undergraduate medical and dental students during two physiology lectures. We selected first-year students as they are newcomers to university education, suggesting a lack of established preferences for specific instructional methods at this early stage. A total of 112 university students, age ≥ 18 y contributed, with an overall participation rate of 68%. Prior to completing the questionnaire, students provided written informed consent to participate. The University Research Ethics Committee (RAKMHSU-HEC) granted approval for the study on 15th November 2023, under the reference number "HEC-10-2023/24-F-M."

Several limitations need to be taken into consideration when interpreting the results of this study. Firstly, the exclusive inclusion of first-year students raises the possibility that their perceptions may differ from those of students in later academic years. Additionally, with a response rate of 68%, the potential impact of non-participating students' perspectives on the results remains uncertain. Furthermore, the preference for didactic lectures may be influenced by the different learning styles of the students, which are not shown in this dataset.¹³ Lastly, additional investigation is warranted by applying this scale to different subjects, employing varied teaching methods, and exploring diverse geographic locations to enhance the generalizability of the scale. In conclusion, we believe that our scale contributes significantly to the medical education field by addressing the gap in measuring student enjoyment in educational contexts. Our full manuscript that contains enhanced findings, analysis and discussion will be published in another venue.

Ethics and consent

The University Research Ethics Committee (RAKMHSU-HEC) granted approval for the study on 15th November 2023, under the reference number "HEC-10-2023/24-F-M."

Students provided written informed consent to participate.

Data availability

Underlying data

Zenodo: Development and Application of a Learning Enjoyment Scale for Pedagogical Activities, <https://doi.org/10.5281/zenodo.10526239>.¹⁹

This project contains the following underlying data:

- Students' responses to the developed LES: To assess students' enjoyment during didactic lectures and explore possible associated factors.

Extended data

Zenodo: Development and Application of a Learning Enjoyment Scale for Pedagogical Activities, <https://doi.org/10.5281/zenodo.10526239>.¹⁹

This project contains the following extended data:

- Learning Enjoyment Scale (LES): Developed for evaluating both active and passive educational activities.

Data are available under the terms of the [Creative Commons Zero](https://creativecommons.org/licenses/by/4.0/) (CC0 1.0 Public domain dedication).

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Mohi Eldin Magzoub

United Arab Emirates University, Al Ain, United Arab Emirates

The responses are appropriate and satisfactory

Is the rationale for creating the dataset(s) clearly described?

Yes

Are the protocols appropriate and is the work technically sound?

Yes

Are sufficient details of methods and materials provided to allow replication by others?

Yes

Are the datasets clearly presented in a useable and accessible format?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: This article aims at developing a useful tool for measuring student engagement and satisfaction

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Version 1

Reviewer Report 22 July 2024

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Mohi Eldin Magzoub

United Arab Emirates University, Al Ain, United Arab Emirates

This study introduced a new instrument called the Learning Enjoyment Scale, which is used to assess the degree of enjoyment experienced by students. It is derived from Bloom's taxonomy. The scale encompasses the majority of the taxonomy categories on the knowledge domain and few items on the affective domain.

Nevertheless, the scale primarily serves to categorize learning objectives in order to facilitate course design and direct assessment. Thus, it aims to enhance the overall efficacy of the learning and teaching process, and not directly put an emphasis on enjoyment.

Although enjoyment is not explicitly stated as an objective in the affective domain, it can be seen as a constituent of favorable attitudes and values towards learning. The affective domain encompasses various categories, such as perceiving events, reacting to phenomena, assigning value, organizing, and characterizing based on a set of values. Enjoyment can be understood as the process of appreciating and reacting to various experiences, where the active involvement and curiosity of students in educational tasks play a significant role.

There are only four items in the scale that directly focus on enjoyment and satisfaction, which are questions 5, 6, 11, and 12.

Other learning theories might be explored that nest suit student enjoyment such as experiential learning self-determination, and constructivism theories.

Another issue with the methodology is the lack of clear objectives. It is unclear whether the goal is to validate the scale by assessing reliability and validity, or to present the performance of students based on the items of the scale. The objectives must be explicitly stated and appropriately included into this section.

Another concern is how the cut-off points for determining excellence, poor, and low are established.

The utilization of the five-point Likert scale is not suitable in this context. The scale must adhere to a linear format instead than a categorized format. For example, a value of 3 for "unsure" indicates that it cannot be decided whether it is high or low. An optimal approach would be to employ a rating scale consisting of either 5 or 10 points, including a spectrum from poor to excellent. Subsequently, a composite score can be calculated based on this scale.

Is the rationale for creating the dataset(s) clearly described?

Yes

Are the protocols appropriate and is the work technically sound?

Partly

Are sufficient details of methods and materials provided to allow replication by others?

Partly

Are the datasets clearly presented in a useable and accessible format?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: This article aims at developing a useful tool for measuring student engagement and satisfaction

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 26 Jul 2024

Tarig Merghani

Thank you very much for the comprehensive review and valuable comments. We have carefully considered the points you raised and prepared an updated version of our data note (version 2). Please, find our detailed responses to the raised points below.

Student Enjoyment is a state of psychological happiness experienced during learning. It is nicely defined by Hartley as the pleasant emotional state of the learner that develops during an educational activity due to experiencing a positive situation that motivates the learner to complete the task to persevere this feeling (1). It is different from engagement, satisfaction or motivation. Since it is subjective feeling, there is no widely accepted scale for assessing enjoyment. Authors tried different methods ranging from a single question rating (for example from 0 to 6) (2), to different types of questionnaires such as satisfaction questionnaire with open ended questions (3, 4), adapted items from Achievement Emotions Questionnaire (5) and researcher-prepared questionnaire based on enjoyment indicators (6). In our scale, we utilized direct questions to measure enjoyment, and we added other questions to assess the students' perception of different domains of learning (knowledge, comprehension, application, and analysis) which are known to be influenced by enjoyment (Q1 to 6). Other questions (Q7 to 12) are not intended to measure the enjoyment, they are intended to study certain factors that are known to influence enjoyment. The primary objective of this study is to develop a comprehensive learning enjoyment scale for the evaluation of both active and passive teaching activities. We sought to apply this scale objectively to measure the enjoyment scores of Physiology lectures and investigate associated factors. As suggested by the reviewer, we clearly mentioned the objectives of our study in the updated version of the article.

The suggestion to explore other learning theories like experiential learning, self-determination theory, and constructivism is well-taken. We plan to incorporate discussions on how these theories could complement our findings on student enjoyment and educational outcomes in future studies. We also have the idea to revise and update our scale in the future based on feedback from reviewers and valuable suggestions from colleagues.

The Learning Enjoyment Scale (LES) employs a five-point Likert scale (1 = strongly disagree to 5 = strongly agree) across its six dimensions, yielding total scores ranging from 6 to 30.

The 80% represents the fourth option of the Likert scale (agree = 4), as $4/5 \times 100\% = 80\%$. Therefore, scores above 80% generally indicate that all responses are agree or above. The 60% represents the third option (unsure = 3), as $3/5 \times 100\% = 60\%$. Therefore, scores below 60% generally indicate that all the responses are disagree or below. The 5-Likert scale selection and categorization into excellent, acceptable, and low is justified by its ability to provide clear interpretations of students' enjoyment levels. In addition, the thresholds (60% and 80%) align with educational standards commonly used to assess performance and satisfaction levels in various academic contexts.

In conclusion, we believe that our scale contributes significantly to the medical education field by addressing the gap in measuring student enjoyment in educational contexts. We appreciate the opportunity to revise our manuscript based on the reviewer's valuable feedback and look forward to sharing our full manuscript that contains enhanced findings, analysis and discussion with the academic community in the near future.

Thank you once again for your thorough evaluation and insightful comments.

Best regards,

Tarig Merghani

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Competing Interests: I have no competing interests

Reviewer Report 17 May 2024

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Tarig Fadelelmoula 

National University of Science and Technology, Muscat, Oman

Existing student learning enjoyment evaluation scales are not sufficiently tested. The objective of this project is to develop and apply a new learning enjoyment scale for evaluating students' enjoyment during different pedagogy sessions. The researchers designed the tool in accordance with Bloom's taxonomy. The tool had two sections: (1) A six-domain Likert scale, (2) examining specific factors influencing overall enjoyment, such as teacher proficiency, topic difficulty, active student participation, objectives fulfillment, low stress levels, and self-perceived acquisition of skills. The scale was implemented in year 1 medical and dental students. The initial analysis of data reflected the internal consistency of the scale; however, the results are limited by the low response rate, the confinement to didactic lectures, and student level. Further research is needed to include a larger group of students, check the reliability of the scale, and test it in student centered pedagogies.

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Is the rationale for creating the dataset(s) clearly described?

Yes

Are the protocols appropriate and is the work technically sound?

Yes

Are sufficient details of methods and materials provided to allow replication by others?

Yes

Are the datasets clearly presented in a useable and accessible format?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Pulmonology, Physiology, Medical Education, Healthcare Simulation

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 10 Jun 2024

Tarig Merghani

Many thanks for the review comments. We appreciate your insights and feedback on our data note. Further results and analysis will be presented in a full article (under review). We acknowledge that existing student learning enjoyment evaluation scales have not been sufficiently tested, which is why our project aimed to fill this gap by designing a comprehensive tool based on Bloom's taxonomy. We are pleased that the initial analysis reflected the internal consistency of the scale. However, we also recognize the limitations you pointed out, namely the low response rate, the confinement to didactic lectures, and the restriction to year 1 medical and dental students. We are planning to address these limitations by including a larger and more diverse group of students. Thank you once again for your valuable feedback.

Regards
Tarig Merghani

Competing Interests: I have no competing interests to disclose

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