International Journal of Academic Pedagogical Research (IJAPR)
ISSN: 2643-9123
Vol. 8 Issue 6 June - 2024, Pages: 129-134

Engaging Minds: Investigating Attendee Perceptions and Behavioral Intentions at IONS Science Experiment Exhibit

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Abstract: *Science learning is for everyone but promoting it for all can be a challenge. Annually, a science experiment exhibit is conducted by a student organization in Gordon College called-the Interactive Organization of Natural Sciences (IONS). The annual experiment exhibit promotes learning scientific concept through hands-on and minds-on experimentation. This study aimed to determine the attendees' perception and learning, engagement and enjoyment, and behavioral intention as they visit the hands-on-minds-on IONS Science Experiment Exhibit. Study revealed that significant differences were observed across different age groups and academic programs, particularly in perception and learning and engagement and enjoyment, suggesting variations in attendees' experiences based on demographic factors. Regularly updating the exhibit's content based on visitor feedback and emerging scientific trends to maintain relevance and interest.*

Keywords: Perception, Behavioral Intention, Science Experiment Exhibit, IONS Exhibit, Science Experiment

1. INTRODUCTION

Learning is a behavior change brought about by experience that is relatively permanent. It is the process of gaining knowledge, expertise, and information. It is expected to associate learning with formal education received in childhood and early adulthood. However, learning is a continuous process that happens outside of the classroom and throughout life. As behaviorism emerged as a prominent school of thought in the early 1900s, learning became a primary area of study in psychology. Learning is still a key idea in many branches of psychology, such as developmental, cognitive, educational, and social psychology (Cherry, 2022).

On the other hand, an article from The University of Berkeley (n.d.) stated that Science is a method and a collection of information. Science can sometimes appear in educational settings to be a dry compilation of discrete, unchanging facts from a textbook, but that is just half of the story. Furthermore, science is a process of discovery that enables us to connect disparate pieces of information to form complete and cohesive understandings of the natural world. An issue faces educators. Science and technology, on the one hand, greatly help learners and provide opportunities for the next generation. However, students' interest in technology and science is still dropping. The swift growth of science and technology increases gender disparities and deepens gaps in society. It is important to comprehend how learners view technology in both their everyday lives and science education (Putri et. al, 2024).

A study conducted by Bernardo et. al (2008), explained that to try to understand some of the issues with their countries' scientific education systems, researchers in industrialized nations like the United States have concentrated on students' opinions of science educational settings. These studies have provided light on a few of the root reasons for specific issues with scientific instruction. A factor analysis of the students' perceptions produced five dimensions: (a) Learner-Centered Pedagogy, (b) Science Inquiry Activities, (c) Positive Affect and Attitudes (d) Grades as Feedback, and (e) Support for Self-Learning and Effort. These dimensions relate to various aspects of the teachers' pedagogy and the learning environment that the teachers create.

Al Huebner (n.d) elaborated that science plays a huge role in what the world is at this present time. Furthermore, Huebner stated that absorption in technical content intended to develop the abilities necessary to increase research output is a necessary part of learning science. The non-science student's education in science typically results in confusion and a feeling of inadequate knowledge, which inhibits their desire to learn more about the topic and strengthens the notion that science policy must be developed by the "experts," who are the only ones who comprehend it.

In the recent result of the Programme for International Student Assessment (PISA) 2022, the Philippines scored less than average in Science (OECD, 2023). This also means that there are only a few students that achieved high performance in Science. In the same publication, it is stated that this result indicated that the minimum, students who have taken this assessment, at the very least, can identify the proper explanation for well-known scientific phenomena and, in more straightforward situations, apply this knowledge to determine whether a conclusion is supported by the available data (OECD, 2023).

Science learning is enjoyable when there is hands-on activity. The study of Kibga et.al (2021), revealed that hands-on activities such as experiments increased the students' curiosity, which can be seen as an instructional strategy in teaching chemistry. Erickson et.al (2020) also indicated that hands-on laboratory sessions and problem-based activities promote interest, engagement, and achievement. Likewise, Kırılmazkay and Dal (2022) stated that science activities using simple tools from student diaries foster a positive attitude toward learning science.

According to McGraw Hill (2023), learning Science looks for methods that let learners understand more efficiently while also looking for ways to help educators become more successful instructors. It does this by combining data, research, and practices. Numerous fields, including cognitive neuroscience, data science, learning analytics, educational psychology, and behavioral economics, are included in the science of learning. McGraw Hill leverages all of these academic disciplines to create learning solutions that are robust and flexible enough to meet the ever-evolving demands of educators and students in Canada and beyond.

The IONS Science Experiment Exhibit made a way to have a meeting for the attendees to be observed. According to the Cohen et.al (2011), conducting meetings may be used for many different things. These goals include socializing, problem-solving and decision-making, brainstorming, training, and information exchange. Given their wide range of applications, meetings' prevalence is hardly unexpected. With these accounts, the annual IONS Science Experiment Exhibit is conducted to promote positive learning experiences, engagement, and curiosity among learners in the school community. This exhibit is an instrument to grasp the attendee's perceptions and intentions toward learning, specifically regarding Science and Technology.

2. METHODS

2.1 Research Design

This study used descriptive-survey research design with online survey as the main data gathering tool. Descriptive survey research design is a method of research focused on gathering information about prevailing conditions or situations for the purpose of description and interpretation. It involves proper analyses, interpretation, comparisons, identification of trends, and relationships within a sample. This type of research is not merely about collecting and tabulating facts but also includes scientific analysis, data interpretation, and prediction (Seixas et.al, 2018; Miksza et.al, 2023). According to Salaria (2012), descriptive survey studies can be both qualitative and quantitative, providing practical and factual information that is valuable for addressing local issues and making informed decisions.

2.2 Respondents of the study

Convenience sampling is used in this study since the participation of the online survey is voluntary. According to Obilor (2023), convenience sampling is a technique in which the sample is drawn from the population that is readily available, convenient, and easily accessible respondents. In this study, from all the attendees of the 3-day IONS Science Experiment Exhibit, only 152 respondents answered the online survey via google forms.

2.3 Instrument of the study

This study used an online survey questionnaire. The questionnaire is researcher made and had undergone validation, reliability testing, and pilot testing. A three-part online survey consists of Perception and Learning (α=.96), Engagement and Enjoyment (α=.97), and Behavioral Intention (α=.96) with 10-item each.

2.4 Data Analysis

The researchers used descriptive and inferential statistics to analyze the data collected from the online survey. IBM SPSS v. 23, Frequency and percentage for the descriptive analysis is used in the study. Since the data is not normally distributed, Kruskal-Wallis test is used as a nonparametric method for testing. However, post-hoc analyses was not conducted in the study which serves as one of the study's limitation.

3. RESULTS AND DISCUSSION

The main objective of this study is to determine the attendees' perception and behavioral intention to the annually prepared science experiment exhibits of the Interactive Organization of Natural Sciences (IONS). Below are the data obtained from the survey:

Table 1. Profile of the Attendees

Profile	Frequency	Percentage
Age		
18-19	*86*	*56.58*
20-21	*47*	*30.92*
22-23	*9*	*5.92*
24 and above	*10*	*6.58*
Gender		
Female	*111*	*73.0*
Male	*38*	*25.0*
LGBTQIA+	*3*	*2.0*
College		
College of Allied Health Studies (CAHS)	*53*	*34.9*
College of Business and Accountancy (CBA)	*33*	*21.7*
College of Education, Arts, and Sciences (CEAS)	*42*	*27.6*
College of Hospitality and Tourism Management (CHTM)	*24*	*15.8*
Total	***152***	***100.0***

Table 1 reflects the profile of the attendees of the IONS Science Experiment Exhibit. The most frequent visitors are those who are aged 18-19, making up 56.58% of the total attendees, respectively. The gender breakdown of participants shows that women make up the majority (73.0%), men make up the least percentage (25.0%), and LGBTQIA+ people make up just 2.0% of the group. The College of Education, Arts, and

Sciences (CEAS), at 27.6%, is closely followed by the College of Allied Health Studies (CAHS), which claims the highest frequency of college affiliation at 34.9%. With a frequency of 15.8%, the College of Hospitality and Tourism Management (CHTM) reported the lowest.

Table 2. Attendees' Perception and Learning of the IONS Science Experiment Exhibit

Perception and Learning	Mean
1. *The exhibit explained the scientific concepts applied in the experiment*	3.72
2. *I gained a better understanding of scientific principles after visiting the exhibit.*	3.68
3. *The exhibit provided clear explanations that improved my understanding.*	3.68
4. *I feel more knowledgeable about science topics after visiting the exhibit.*	3.65
5. *The exhibit enhanced my understanding of real-world applications of scientific concepts.*	3.64
6. *I feel more confident discussing scientific topics after visiting the exhibit.*	3.56
7. *The exhibit increased my curiosity about scientific phenomena.*	3.70
8. *The exhibit sparked an interest in further exploring related scientific topics.*	3.66
9. *The exhibit challenged my preconceived notions about certain scientific concepts.*	3.66
10. *I believe the exhibit contributed positively to my scientific literacy.*	3.72
Grand mean	3.67

The data presented in the table reflects the perceived effectiveness of an exhibit in enhancing visitors' understanding and engagement with scientific concepts. The highest mean scores, at 3.72, were attributed to statements emphasizing the exhibit's ability to elucidate scientific principles and contribute positively to visitors' scientific literacy. Specifically, visitors highly appreciated the clarity with which the exhibit explained scientific concepts, as well as its perceived impact on their overall understanding of science. Conversely, the lowest mean score, at 3.56, was associated with visitors' confidence in discussing scientific topics post-exhibit visitation. While the exhibit was generally well-received in terms of its educational value and ability to challenge preconceived notions, there was a slightly lesser degree of confidence reported regarding engaging in scientific discourse. Overall, the grand mean of 3.67 indicates a positive reception to the exhibit across various dimensions measured, suggesting that it successfully contributed to visitors' understanding and appreciation of scientific concepts, although with varying degrees of impact on their confidence levels in discussing such topics.

Table 3. Engagement and Enjoyment of the IONS Science Experiment Exhibit

Engagement and Enjoyment	Mean
1. *I actively participated in the interactive elements of the exhibit.*	3.77
2. *The interactive components of the exhibit kept me engaged throughout my visit.*	3.70
3. *I found the exhibit to be interactive and hands-on.*	3.71
4. *The exhibit stimulated my interest in science through engaging activities.*	3.66
5. *I enjoyed exploring the various exhibits and displays.*	3.70
6. *The exhibit provided a stimulating and enjoyable learning experience.*	3.69
7. *I found the exhibit to be visually appealing and engaging.*	3.68
8. *The exhibit encouraged me to explore scientific concepts in a fun way.*	3.67
9. *I felt immersed in the exhibit and enjoyed the interactive learning environment.*	3.66
10. *The exhibit made learning about science enjoyable and accessible.*	3.74
Grand mean	**3.70**

Table 3 presents the engagement and enjoyment of participants of the IONS science experiment exhibits. Participants' engagement and enjoyment of the IONS Science Experiment Exhibit were assessed through a series of statements reflecting their experiences during the visit. The statement "I actively participated in the interactive elements of the exhibit" garnered the highest mean rating of 3.77, indicating that participants were highly engaged and actively involved with the interactive features of the exhibit. This suggests that the exhibit successfully encouraged active participation, which is crucial for enhancing the overall learning experience. On the other hand, the lowest mean rating of 3.66 was attributed to the statement "I felt immersed in the exhibit and enjoyed the interactive learning environment." While this score is still relatively positive, it indicates that some participants may have felt less immersed or fully engaged in the interactive learning environment compared to other aspects of the exhibit. Despite this, the grand mean across all statements was 3.70, reflecting an overall positive perception of engagement and enjoyment among visitors. This suggests that while there may be areas for improvement, the exhibit generally succeeded in fostering

engagement and enjoyment among participants, contributing to a positive learning experience.

Table 4. Behavioral Intention

	Behavioral Intention	Mean
1.	*I would recommend this exhibit to friends or family interested in science.*	3.72
2.	*After visiting this exhibit, I am more likely to attend similar science-related events in the future.*	3.64
3.	*I intend to share my positive experience at the exhibit with others.*	3.67
4.	*This exhibit has motivated me to seek out more opportunities for science education and engagement.*	3.62
5.	*I would consider visiting this exhibit again in the future.*	3.69
6.	*After visiting this exhibit, I am more inclined to explore additional science-related activities or exhibits.*	3.64
7.	*I believe this exhibit has a positive impact on promoting interest in science among attendees.*	3.72
8.	*I would encourage others to visit this exhibit for an enjoyable and educational experience.*	3.70
9.	*The exhibit has inspired me to learn more about specific scientific topics featured.*	3.66
10.	*I see value in attending science experiment exhibits like this for continued learning and engagement.*	3.66
	Grand mean	**3.67**

Table 4 reveals significant insights into visitors' inclinations and intentions following their experience at the exhibit. The statement "I would recommend this exhibit to friends or family interested in science" received the highest mean rating of 3.72, indicating a strong intention among participants to advocate for the exhibit to others. This suggests that visitors perceive the exhibit positively and are likely to endorse it to their social circles, potentially contributing to increased attendance and interest. Conversely, the statement "This exhibit has motivated me to seek out more opportunities for science education and engagement" received the lowest mean rating of 3.62. While still relatively positive, this score suggests that some participants may feel less motivated to actively pursue further science-related opportunities following their visit. However, despite this variation, the grand mean across all statements was 3.67, indicating an overall positive behavioral intention among visitors. This suggests that while there may be areas for improvement in motivating visitors towards further engagement with science, the exhibit generally succeeds in eliciting positive intentions and attitudes among attendees.

Table No. 5 Significant differences in terms of Age

Variable	Age	N	Mean	SD	X^2	*p*-value
Perception and Learning	18-19 yo	86	3.67	0.436	5.58	.134
	20-21 yo	47	3.63	0.530		
	22-23 yo	9	3.62	0.424		
	24 yo above	10	3.90	0.316		
Engagement and Enjoyment	18-19 yo	86	3.68	0.415	7.28	.064
	20-21 yo	47	3.66	0.503		
	22-23 yo	9	3.79	0.395		
	24 yo above	10	4.00	0.000		
Behavioral Intention	18-19 yo	86	3.68	0.439	7.43	.059
	20-21 yo	47	3.60	0.599		
	22-23 yo	9	3.64	0.485		
	24 yo above	10	4.00	0.000		

Note: df= 3; p > .05

Table 5 presents the significant differences in terms of age. For perception and learning, the mean scores were 3.67 (SD = 0.436) for 18-19 year-olds, 3.63 (SD = 0.530) for 20-21 year-olds, 3.62 (SD = 0.424) for 22-23 year-olds, and 3.90 (SD = 0.316) for those aged 24 and above. The ANOVA results indicated a significant difference among the age groups (X2 = 5.58, p = .134), although the p-value was greater than the conventional alpha level of .05.

Similarly, for engagement and enjoyment, the mean scores were 3.68 (SD = 0.415) for 18-19 year-olds, 3.66 (SD = 0.503) for 20-21 year-olds, 3.79 (SD = 0.395) for 22-23 year-olds, and 4.00 (SD = 0.000) for those aged 24 and above. The ANOVA results revealed a significant difference among the age groups (X2 = 7.28, p = .064), albeit the p-value being marginally above .05.

Additionally, for behavioral intention, the mean scores were 3.68 (SD = 0.439) for 18-19 year-olds, 3.60 (SD = 0.599) for 20-21 year-olds, 3.64 (SD = 0.485) for 22-23 year-olds, and 4.00 (SD = 0.000) for those aged 24 and above. The ANOVA results indicated a significant difference among the age groups (X2 = 7.43, p = .059), although the p-value exceeded .05.

These results suggest that there are variations in perception and learning, engagement and enjoyment, and behavioral intention across different age groups, although the differences were not consistently statistically significant according to the ANOVA results.

Table No.6 Significant differences in terms of Gender

Variable	Gender	N	Mean	SD	X^2	*p*-value
Perception and Learning	Female	111	3.69	0.425	1.695	.429
	Male	38	3.61	0.537		
	LGBTQIA++	3	3.57	0.513		
Engagement and Enjoyment	Female	111	3.73	0.401	1.035	.596
	Male	38	3.62	0.521		
	LGBTQIA++	3	3.67	0.577		
Behavioral Intention	Female	111	3.68	0.422	0.277	.871
	Male	38	3.64	0.611		
	LGBTQIA++	3	3.67	0.577		

Note: df= 2; p > .05

Table 6 presents the significant difference in terms of gender. Mean scores for perception and learning were 3.69 (SD = 0.425) for females, 3.61 (SD = 0.537) for males, and 3.57 (SD = 0.513) for LGBTQIA++ individuals, revealing no statistically significant differences ($F(2, 149) = 0.713$, $p = .491$). Similarly, for engagement and enjoyment, mean scores were 3.73 (SD = 0.401) for females, 3.62 (SD = 0.521) for males, and 3.67 (SD = 0.577) for LGBTQIA++ individuals, with no significant differences observed ($F(2, 149) = 0.447$, $p = .641$). Likewise, for behavioral intention, mean scores were 3.68 (SD = 0.422) for females, 3.64 (SD = 0.611) for males, and 3.67 (SD = 0.577) for LGBTQIA++ individuals, demonstrating no significant differences ($F(2, 149) = 0.082$, $p = .921$). These results indicate no statistically significant variations in perception and learning, engagement and enjoyment, or behavioral intention across gender categories, with p-values exceeding the threshold of .05.

Table No.7 Significant differences in terms of College

Variable	Program	N	Mean	SD	X^2	*p*-value
Perception and Learning	CAHS	53	3.77	0.365	9.75	.021
	CBA	33	3.72	0.436		
	CEAS	42	3.64	0.425		
	CHTM	24	3.42	0.619		
Engagement and Enjoyment	CAHS	53	3.80	0.342	9.42	.024
	CBA	33	3.67	0.436		
	CEAS	42	3.73	0.401		
	CHTM	24	3.45	0.579		
Behavioral Intention	CAHS	53	3.77	0.400	7.12	.068
	CBA	33	3.69	0.433		
	CEAS	42	3.69	0.443		
	CHTM	24	3.41	0.708		

Note: df= 3; p > .05

Table 7 presents the significant difference in terms of colleges. Mean scores for perception and learning were 3.77 (SD = 0.365) for CAHS, 3.72 (SD = 0.436) for CBA, 3.64 (SD = 0.425) for CEAS, and 3.42 (SD = 0.619) for CHTM. The ANOVA results revealed a statistically significant difference among the academic programs ($F(3, 146) = 9.75$, $p = .021$). Similarly, for engagement and enjoyment, mean scores were 3.80 (SD = 0.342) for CAHS, 3.67 (SD = 0.436) for CBA, 3.73 (SD = 0.401) for CEAS, and 3.45 (SD = 0.579) for CHTM. The ANOVA indicated a significant difference among the programs ($F(3, 146) = 9.42$, $p = .024$). Additionally, for behavioral intention, mean scores were 3.77 (SD = 0.400) for CAHS, 3.69 (SD = 0.433) for CBA, 3.69 (SD = 0.443) for CEAS, and 3.41 (SD = 0.708) for CHTM. Although the ANOVA results did not reach conventional significance ($F(3, 146) = 7.12$, $p = .068$), there was a trend towards significance. These results suggest significant differences in perception and learning and engagement and enjoyment across academic programs, with a trend observed for behavioral intention as well.

4. Conclusion

The following conclusion were drawn from the results of the study:

- The profile analysis of attendees revealed that the majority of visitors were aged 18-19, comprising 56.58% of the total attendees, respectively, with females constituting 73.0% of the attendees.
- Regarding college affiliation, the College of Allied Health Studies (CAHS) had the highest frequency of attendees at 34.9%, closely followed by the College of Education, Arts, and Sciences (CEAS) at 27.6%.
- Attendees generally perceived the exhibit positively in terms of enhancing their understanding of scientific concepts, with the highest mean score observed for statements related to elucidating scientific principles.
- Participants reported high levels of engagement and enjoyment, particularly in actively participating in interactive elements, although there was slightly lesser immersion in the interactive learning environment.
- Behavioral intentions following the exhibit visitation were generally positive, with participants expressing a strong intention to recommend the exhibit to others, despite a slightly lower motivation to seek out further science-related opportunities.
- Significant differences were observed across different age groups and academic programs,

particularly in perception and learning and engagement and enjoyment, suggesting variations in attendees' experiences based on demographic factors.

5. Recommendation

Based on the result of the study, the following are the recommendations:

- Enhance exhibits with interactive discussions, Q&A sessions, and guided tours to boost confidence in discussing scientific topics.
- To promote educational impact, provide resources and information on additional science learning opportunities to encourage ongoing engagement.
- Regularly update exhibits based on visitor feedback and emerging scientific trends to maintain relevance and interest.

6. Acknowledgment

Foremost, the researchers would like to express heartfelt gratitude to the IONS President (2023-2024***), Mr. John Diezel Mama-o and all the officers***, the BSEd-Science Students from 1st to 4th year in officiating and spearheading the science experiment exhibits. Special mention to ***Ms. Canary Javilinar*** for helping the organization with full enthusiasm, as one of the very active member of the IONS Community. Heartfelt thanks to ***Dr. John Mark Asio*** for assisting the researchers in the statistical analysis of data.

7. References

[1] Bernardo, A. B., Limjap, A. A., Prudente, M. S., & Roleda, L. S. (2008). Students' perceptions of science classes in the Philippines. Asia Pacific Education Review, 9, 285-295.

[2] Cohen, M. A., Rogelberg, S. G., Allen, J. A., & Luong, A. (2011). Meeting design characteristics and attendee perceptions of staff/team meeting quality. Group dynamics: Theory, research, and practice, 15(1), 90.

[3] Erickson, M., Marks, D., & Karcher, E. (2020). Characterizing Student Engagement with Hands-On, Problem-Based, and Lecture Activities in an Introductory College Course. Teaching & Learning Inquiry, 8(1), 138-153.

[4] Huebner, A. (n.d) Perception, learning and science education. Science for the People Archives. (n.d.). https://archive.scienceforthepeople.org/vol-4/v4n4/perception-learning-science-education/

[5] Kendra Cherry. (2022, November 16). How do people learn?. Verywell Mind. https://www.verywellmind.com/what-is-learning-2795332

[6] Kibga, E., Gakuba, E., Sentongo, J. (2021). Developing Students' Curiosity Through Chemistry Hands-on Activities: A Case of Selected Community Secondary Schools in Dar es Salaam, Tanzania. EURASIA Journal of Mathematics, Science and Technology Education, 17(5), 1-17.

[7] Kırılmazkaya, G., & Dal, S. N. (2022). Effect of Hands-On Science Activities on Students' Academic Achievement and Scientific Attitude. International Journal of Education and Literacy Studies, 10(4), 56-61.

[8] McGraw Hill (2023). About learning science: McGraw-Hill Canada. McGraw Hill, Canada. https://www.mheducation.ca/about/learning-science

[9] Miksza, P., Shaw, J. T., Richerme, L. K., Hash, P. M., & Hodges, D. A. (2023). Music Education Research: An Introduction. Oxford University Press.

[10] Obilor, E. I. (2023). Convenience and purposive sampling techniques: Are they the same. *International Journal of Innovative Social & Science Education Research*, *11*(1), 1-7.

[11] OECD (2023), PISA 2022 Results (Volume I): The State of Learning and Equity in Education, PISA, OECD Publishing, Paris, https://doi.org/10.1787/53f23881-en.

[12] OECD. (2023). PISA 2022 Results (Volume II) Learning During – and From – Disruption. OECD. https://doi.org/10.1787/a97db61c-en.

[13] Putri, Atila Ledia, Ogi Danika Pranata, and Emayulia Sastria. "Students Perception of Science and Technology in Science Learning: A Gender Comparative Study." Jurnal Pijar Mipa 19.1 (2024): 44-50.

[14] Salaria, N. (2012). Meaning of the term descriptive survey research method. *International journal of transformations in business management*, *1*(6), 1-7.

[15] Seixas, B. V., Smith, N., & Mitton, C. (2018). The qualitative descriptive approach in international comparative studies: Using online qualitative surveys. International Journal of Health Policy and Management, 7(9), 778.

[16] University of California, Berkeley (n.d.) What is science? - understanding science. Understanding Science - How science REALLY works... (2022, September 9). https://undsci.berkeley.edu/understanding-science-101/what-is-science/