

**Exploring the Effects of Parental Engagement, Visit Frequency and Visit Intention on
the Learning Experience of Children in a Museum**

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Abstract

Learning can take place outside the classroom, for example in a museum, where it is called informal learning. Museums have the potential to educate and inspire children, but parents are often unaware of these benefits, while they have the ability to support their child's learning. Potentially, there are parental factors that could further enhance the learning benefits of museums, and research towards this could raise awareness among parents. Children's learning in general has been discussed to be enhanced by the extent to which the parent engages with their child, as well as the museum visit frequency of the parents, and the intention of the parents for the child to have fun and to learn something during the museum visit. The present study aims to research these factors in relation with children's learning experience in museums, with learning experience being identified as the amount of new things a child has learned. To research this, observations, an interview and questionnaires were conducted at the Museum Factory in Enschede, the Netherlands. This museum offers exhibitions around the topics of weather, science, nature, animals and textile machines. Sets of parents and children were observed regarding the amount of engagement the parent had with their child. Afterwards, the parents were questioned about their visit frequency, and their intention with the visit. Lastly the children were interviewed about their potential new knowledge, to check their learning experience. It was found that there seems to be no significant effects on the learning experience regarding the visit frequency score, visit intention scores and engagement score, except for the visit intention of learning, which had a negative significant effect on learning experience, against what was expected. This means that there might be other important factors playing a role in enhancing learning experience in museums, for which more research can be conducted in the future.

Keywords: Parental engagement, parental visit intention, parental museum visit frequency, museum, children's learning experience, informal learning

Introduction

Informal Learning at a Museum

Not all learning that children do, takes place at school. Learning can occur at all locations. When learning occurs at another location than school, this is often identified as informal learning (Callanan et al., 2011). There are several differences between formal and informal learning, next to the difference in location. Multiple definitions of formal and informal learning have been given to make a distinction between the two of them. Jagûst et al. (2018) have summarised and merged multiple definitions that they have found, and concluded that formal learning can be identified as learning that is specifically intended as a learning experience taking place in a structured environment. Informal learning is identified as learning that occurs while doing other activities that are not designed for learning per se, such as family activities or activities with the intent of entertainment (Jagûst et al., 2018).

One example of an informal learning location is a museum. Every year, millions of people visit museums in the Netherlands, among which are parents with children (CBS, 2022). Museums “have the ability to educate, inspire, and connect people from all walks of life” (Arna Bontemps Museum, 2023, p.1). In museums, children can encounter certain subjects that they did not (yet) encounter in school, and museums offer an interesting environment for children to explore (Munley and Center, 2012). Scott (2006) researched the memories adults have of visiting museums in their childhood, and found that some participants of his study highlighted that visiting a museum was a great learning experience for them as a child, and that they remember from their own childhood how much more they learned in a museum, compared to a school lesson (Scott, 2006). Furthermore, research finds that museums can foster critical thinking, communication skills and creativity (Kelly, 2013). Moreso, it is suggested that children who visited museums have an increased level in their reading, science and mathematics skills as compared to children who have not visited museums (Swan, n.d.).

Parents can help improve these positive effects that museums have on children’s learning, since they have the ability to focus their child’s attention towards an exhibit, making that the child interacts with an exhibit for a longer amount of time, which results in more time for the child to absorb new knowledge and information. Parents also have the ability to help their children make links between old and new information, for example by asking questions, eliciting more new knowledge after a museum visit (Acosta et al., 2021). However, parents are often not aware of the learning benefits museums have to offer, and mainly see the museum as an opportunity of fun for their children, and they are therefore not actively

helping their child learn (Song et al., 2017). This may lead to parents not using their abilities to the fullest in helping their children learn from museum exhibitions. This is apparent when we know that parents visiting a museum with children spend less time at exhibits and reading signs than other groups visiting the same museum, such as adults without children (Tenenbaum et al., 2010), even though parents actually have the ability to help their child focus on and spend more time with one exhibit. This leads to the parents and children having less time and opportunity to discuss and explain the information exhibit and gain new knowledge from their visit (Tenenbaum et al., 2010).

Interventions could help with encouraging parents to support their child's learning in a museum, as Tenenbaum et al. (2010) found that intervention aimed at families, for example a booklet of activities to complete together, already helped with prolonging the amount of time spent at a certain exhibit by parents with children. Interventions also have the possible effect of increasing the amount of explaining and interaction a parent engages in with their child (Willard et al., 2019), which could be positively affecting the learning process of a child. To understand in what ways parents can be supported in helping their children learn more from a museum visit, we have to understand which parental factors are influencing a child's learning experience and could be included in an intervention, with learning experience being defined by the amount of new things a child learns or has learned during a museum visit.

Factors Potentially Influencing Learning Experience

Engagement

Parents and in which manner they engage with their children have a significant effect on their children's learning experience, mainly in other environments than school, such as at home (Harris & Goodall, 2008). In schools, parents are likely to be involved in their children's education, for example with educational activities. However, Harris and Goodall (2008) argue that parental involvement in education at home should be encouraged to a bigger extent, as the effect of parental engagement in schools has a low impact. Since it was found that parents' engagement does have the power to influence their children's learning (Harris and Goodall, 2008), it would be interesting to research the effects in a museum since this is a different environment than a school. Additionally, it was already concluded that parents' engagement can have an effect on learning experience outside of school. In that case, parents could be prompted to engage with their children to positively influence the learning experience.

For example, it was found that the amount of involvement or engagement a parent shows during a visit is related to the amount of time a child spends at a certain part of a

museum as well as what they learn from their visit (Puchner et al., 2001). Parents talking with their child, supporting them when something is challenging to understand and giving feedback on their thought processes is helpful for supporting the learning process of the children when doing a scientific task. Children who got explanations from their parents were more likely to gain conceptual understanding than those who did not receive explanations (Fender & Crowley, 2007). Therefore, explanation and engagement also have the potential to be beneficial when children are learning about science in general, for example in a museum.

Downey et al. (2010) have looked into parents and their engagement with children in a museum in a more specific way. They researched the effect of playing with children in a museum as a parent, also a form of engagement, and found that this was beneficial. However, they also gained the knowledge that parents are often unaware of the positive effects playing can have. Furthermore, museums may often be designed in a manner that is unsupportive of encouraging parents to engage with their children (Downey et al., 2010). Munley and Center (2012) add on to this by concluding that adult engagement with their children in museums, can foster the learning of their child positively.

Combining the knowledge that museums are a positive environment for children to learn, and that parents can have a positive impact on the learning experience of their children, it is interesting to research further how and if parental engagement can have an effect on children's learning experiences in museums specifically. This could support and strengthen the knowledge that is currently available about this topic. Potentially, knowledge about this topic could be important in creating interventions for museums in a way that would cause them to be more beneficial to the learning experience of the visitors, especially the children that visit a museum with their parents.

Visit Intention

Parents can take their children to a museum for several reasons. The visit intentions that people in general can have with their visit, can vary. Among other reasons, it may be for social or recreational reasonings. Furthermore, the visit can have an educational purpose, or a cultural one (Falk et al., 1998). Falk et al. (1998) did research towards the effects that the reasons for a visit to a museum can have on the visitor's experience. Their research suggested that the reason for a visit can indeed impact the experience of the visit. Both visitors that voiced high educational or high recreational reasons, were found to have a positive impact on how much the visitors have learned (Falk et al., 1998). This research was not done specifically towards parents and children, however, it is interesting to consider that in general, parents' intention or attitude is known to have influence on the educational

development of their child (Kalimuthu, 2018). For example, parents who have a positive attitude or intention towards learning and education, overall have children with similar learning intentions, leading to better understanding of the educational practices they partake in (Kalimuthu, 2018). Furthermore, parents with the intention to support the education of their child, have children who are more likely to have higher educational achievements than children without such parents (Houtenville & Conway, 2008).

Knowing that the intention of a museum visit can influence the amount of new information obtained by the visitor, as well as that parents' intention positively influences their children's educational development and achievements, it might be the case that the intention of parents is also of influence when the child is visiting a museum, namely influencing the learning experience of the child, thus how much the child learns. Researching this could help us understand whether museums should be promoted in a different manner, namely more about potential learning benefits, or whether parents need more knowledge about the effects of their intentions on their children. This knowledge could potentially positively influence the awareness of the impact that museums (and parents) can have on the knowledge and learning experiences of children. Furthermore, awareness of the potential of museums when it comes to learning possibilities, could influence the intention with which parents come to a museum with their children.

Visit Frequency

Tougu (2021), has found that motivation of the family to visit museums can have a positive effect on the quality of conversation between family members during a museum visit. The research that they conducted, was one of the first in terms of researching what parent motivation can have as an effect on children's learning experience. It was concluded that parents who have higher motivation to learn something from the visit themselves, are more likely to pose open-ended questions to their children, as well as answering their questions, which leads the children to learn more from the museum visit (Tougu, 2021). It is important that parents pose open-ended questions to their children, as they can be used to find out what the child does not yet know, it gives them the chance to talk and makes them feel of interest (Wasik & Hindman, 2013).

Thus, parents' motivation to go to museums, which can be measured with visit frequency, can affect their tendency to ask open-ended questions to their children. These open-ended questions can in turn positively influence the learning experience that their children have in the museum (Tougu, 2021; Wasik & Hindman, 2013). However, maybe this parental visit frequency also has positive influence in a more direct manner. This can be

likely since this has been researched already with teachers and their students; when teachers are motivated or enthusiastic themselves about learning and the learning process of the children or students, this results in students being more motivated to learn themselves, yielding better educational results (Engin, 2020; König, 2020). Potentially this positive effect of motivation on the learning achievement of children is also relevant when it is about the parent's motivation levels, instead of teachers.

Current Research

Summarising the information described above, parents are often visiting museums with the sole reason of fun, without knowledge of the learning benefits that the visit could have for their children (Song et al., 2017). Interventions could potentially increase the awareness of parents when it comes to the learning possibilities that a museum has to offer, but also increase engagement of parents and children with exhibitions (Tenenbaum et al., 2010; Willard et al., 2019). To understand which factors may be aimed at with intervention to enhance children's learning experience in museums when they visit with their parents, literature research was conducted which pointed to a few potentially effective factors, namely engagement, visit intention and visit frequency. These are all potential factors that could positively influence the learning experience of children, however this needs to be further explored. Then, it can be understood whether it is worth designing interventions as to enhance these factors and then better the learning experience of the children. Thus, the impact of parental visit frequency, engagement with their children as well as visit intention remain to be researched further. Therefore, the following research question is proposed:

Is there a relationship between parents' engagement, visit frequency and visit intention and the learning experience of their children in a museum?

To support this research question, the following sub questions have been formulated:

Is there a positive effect of the extent to which parents engage with their children, on the children's learning experience in that museum?

Does the extent to which parents visit museums, have an effect on the learning experience of their children in a museum?

Is there a relationship between the parents' visit intention of a museum, and the resulting learning experience of their children?

Hypotheses

It was hypothesised that both engagement and visit frequency have a positive effect on the learning experience of their children, meaning that the children learn more from their visit to the museum. Furthermore, the visit intention of the parents was also thought to have an effect on the learning experience. Specifically, if parents take their children to the museum either for entertainment or for learning, this would positively impact the amount that their children learned from the visit.

Methods

Design of the Study

It is of interest in this study to research the potential effects of engagement, visit intention and visit frequency of parents on the learning experience of their children. This was done with a mix of qualitative and quantitative methods, combining open ended interview questions with multiple choice questions or grading scale questions in a questionnaire, as well as observations. Participants were recruited in the Museum Fabriek in Enschede, only including parents with elementary school-aged children. A certain exhibit in the museum was chosen, which was also the observation location. Each set of parent(s) and child(ren) who interacted with that exhibit, were included in the study if they gave informed consent. The data was collected over 3 separate days during the school holidays.

Participants

In total, 17 children and one of their parents or caregivers were included in the data collection, and they all gave their informed consent to be included. The participants were all Dutch, and visiting the Museum Fabriek in Enschede. All children were in the elementary school age, ranging from 5 years old until 10 years old ($M=7.94$, $SD=1.48$). In the case that the child was accompanied by more than one caregiver or parent, one of them was chosen for the research, namely the parent that was interacting first with the child.

Materials

Location

The data collection for this research was done in the Museum Fabriek in the city of Enschede, which is located in Twente, the Netherlands. This is a museum mostly aimed at children and families, where one can learn about the machines that were used in the past in the textile factories in Enschede. Furthermore, there are things to learn about science and nature, for example set up animals, fossils, the weather, or Enschede. There is also a part in the museum for children to do creative things, and at the time of research there was an

exhibition about sea monsters, for example with flesh-eating fishes as well as information about sharks.

For the observations, a certain spot in the museum was chosen. In Figure 1 and 2, the observation location is shown from both sides. As can be seen there, among other things you can find a bulb with electricity in it, a frog with information, a wheel that can create lightning when it is turned, and a small set-up how a rainbow is created. On the other side, you can find something about how fog is created, as well as movies about different weather types. Thus, this table has exhibition elements that are mainly related to weather and natural phenomena, which is the topic of this exhibition table. Some, but not all objects are interactive, as you can touch the object, but others are controlled from outside and have accompanying information you can read.

Figure 1

Observation Location From the Front Side



Figure 2*Observation Location From the Back Side*

This spot that was chosen for the data collection, was chosen because it is a small exhibition table with multiple different objects and moving machines on it, which makes it a spot where children can see and learn a lot of things that they have not seen before.

Engagement Observation List

For the observational part of the study, the engagement observation list that can be found in Appendix A was used. There were 5 different categories in the engagement observation list; a parent correcting their child (e.g. a child says something that is not true, and the parent corrects their mistake), a parent answering a question that their child asked them, a parent asking a question to their child, a parent explaining something about the exhibition without the child specifically asking, and a parent initiating their child to interact with the exhibition (e.g. saying “look there” or pointing at something to get their attention). These categories will from now on be referred to as correcting, answering, asking, explaining, and initiating, respectively. This engagement observation list was used when the parent and child were visiting the exhibition table, and the observations were done for as long as they kept interacting with the items on the table.

Consent and Demographics

A small demographics questionnaire was used that can be found in Appendix B. This questionnaire included questions to ask for consent, as well as demographics information such as the age of the children and origin of their parents.

Visit Frequency and Intention Questionnaire

The Visit frequency and intention questionnaire, with the questions to be posed to the parents, can be found in Appendix C. Firstly, 4 questions were asked to the parents about their visit intention. They had to give a rating of 1-10 to 4 different reasons to visit the museum. The 4 different reasons to choose from were fun, learning, important topics and family time, which will from now on be referred to as fun, learning, topics and time. An example of this question is: “On a scale of 1-10, in how far did you visit the museum today so that you and your family could spend some time together?”. Furthermore, there was a question about visit frequency of museums, where parents are asked to indicate how often they visit a museum with their children, choosing from the options never, less than 4 times per year, more than 4 times per year, once each month and more than once each month.

Learning Experience Interview

The learning experience interview, aimed to find out more about the learning experience of the children, can be found in Appendix D. In total, 5 main questions were asked, with more sub questions to be used if necessary, for example if a child does not give descriptive enough answers. These questions were about their favourite object on the table and what they learned about it. Also, there is a question asking whether they had learned anything else in the rest of the museum, to find out in how far the children had learned something new, to measure their learning experience and whether they wanted to learn more.

Procedure

When a child and their parent or caregiver arrived at the exhibition table, they were observed using the engagement observation list. It was counted on paper how many times something in the list occurred, and the total was written down in the list. This was done until the child and parent were finished interacting with the table, so when they walked away from it. At that point, the parent or caregiver was approached and asked for consent to be asked a few questions using the demographics questionnaire. All approached participants gave their consent, so none of the observations had to be excluded. Then, they were asked the questions from the visit frequency and intention questionnaire, and their answers were noted down in key words. Following this it was asked to the parents as well as the child themselves, if the children would also be okay with answering a few questions. Afterwards, the learning experience interview was used, noting down the answers in key words. If at any point the parent or child mentioned not wanting to proceed with the questionnaires or interview, or answer one of the questions, the rest of their collected data was deleted and they could

proceed with their day. However, this did not occur during the data collection process. The participants were then thanked for their participation and the procedure could start again when the next participants approached the observation location.

Data Analysis

Three independent variables were of interest in the research questions, namely engagement, visit intention and visit frequency. The answers given to the visit frequency and intention questionnaire as well as the observations conducted for engagement were analysed for visit frequency, visit intention and engagement separately. Furthermore, the dependent variable in this study was learning experience.

Learning Experience

The dependent variable was the children's learning experience. The children could receive a learning experience score of 0, 1 or 2, depending on the extent to which they learned something new on the day of observation, and in how far they went into detail about it. A learning experience score of 0 meant that a child did not mention anything new that they have learned, a learning experience score of 1 meant that the child could mention one new thing they have learned, and a learning experience score of 2 meant that the child could mention multiple new things that they have learned.

Engagement

For the independent variable engagement, the observations were used to create an engagement score, with the amount of interactions (engagements) that were counted between a parent and a child in total as the engagement score. Based on that, the parents could be divided into a group of low-engagers (engagement score of less than 5) and a group of high-engagers (engagement score of 5 or more). Using a chi-square test, it was analysed whether a relationship exists between the variable engagement and the variable learning experience.

Visit Intention

For the independent variable visit intention, the 4 groups of learning, fun, topics and time were kept. The scores on a scale of 1-10 that had been given by the parents to each of the different visit intention types, were compared with the learning experience of the children using Spearman's Rho test.

Visit Frequency

For visit frequency, the parents who indicated to go to a museum at least 4 times each year, were seen as often-visiting, and those going less than 4 times each year, were seen as less-visiting. Then, the independent variable visit frequency and the dependent variable

learning experience were analysed using a chi-square test, checking for a significant relationship between the two categorical variables.

Interrater Reliability

In order to check the interrater reliability of the research at hand, a fellow researcher was asked to look at the answers that the children gave, and give them a score of 0,1 and 2 based on the description given above. Afterwards, it was checked whether the other researcher had given the same scores as the original researcher, as to check the interrater reliability. The data of 20% of the participants were scored by the other researcher, and all these scores were the same as given originally, giving an interrater reliability (Cohen's Kappa) of 1.00.

Results

Engagement

Based on the observations done during data collection, the engagement scores were created. The engagement score of a participant is the same as the total number interactions that were observed between parent and child. The average engagement score of the participants was 5.53 (SD = 2.76). Table 1 shows more information, where it can be seen that parents mainly engaged with their children through explaining them something, or initiating contact with the exhibition.

Table 1

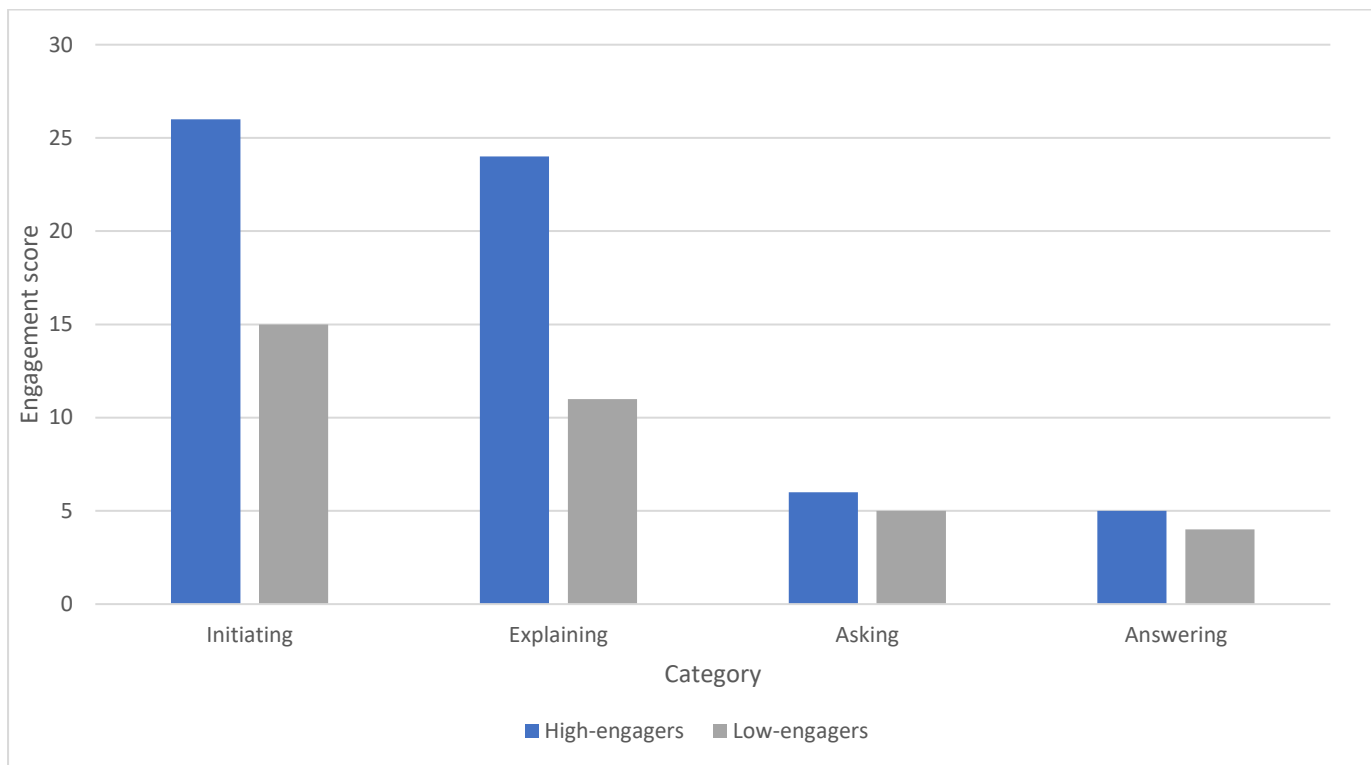
Descriptive Statistics for the Different Engagement Categories

Category	Frequency	M	SD
Correcting	0	0.00	0.00
Explaining	35	2.06	1.39
Answering	9	0.53	0.62
Asking	9	0.53	0.72
Initiating	41	2.41	1.42

Combining all 17 participants for all categories, there were 94 engagements counted. Looking at all categories combined, the participant can be divided by their engagement scores, where those scoring lower than 5 are seen as low-engagers, whereas those who scored higher than 5, are high-engagers. In total, 8 participants are high-engagers, and 9 participants are low-engagers. To understand the usage of type of engagement better, a histogram was created for both the high-engagers and low-engagers, and what their engagement scores were per category. This is shown in Figure 3.

Figure 3

Engagement Score per Category for Low-engagers and High-engagers



Using a Kruskal-Wallis test, the distribution of scores over the different categories of engagement for the two groups (high-engagers and low-engagers) were compared. It revealed that there was no significant difference in the distribution of scores across the categories between the high-engagers and low-engagers (Kruskal-Wallis chi-squared = 1.03, df = 1, p = .31).

The scores of the children corresponding to the high-engaging parents, were compared with the scores of the children corresponding to the low-engaging parents. This yielded the results that are shown in Table 2.

Table 2

Descriptive Statistics for Learning Experience Scores Corresponding with the High-engaging and Low-engaging Parents

Engagement score	M learning experience	SD learning experience
High-scoring (N=8)	1.00	0.73
Low-scoring (N=9)	0.67	0.73

A contingency table was created with the data that was collected about learning experience and engagement score, which can be seen in Table 3.

Table 3

Contingency Table About the Engagement Scores and Learning Experience Scores

	Learning experience score 0	Learning experience score 1	Learning experience score 2
High-engaging	2	4	2
Low-engaging	4	4	1

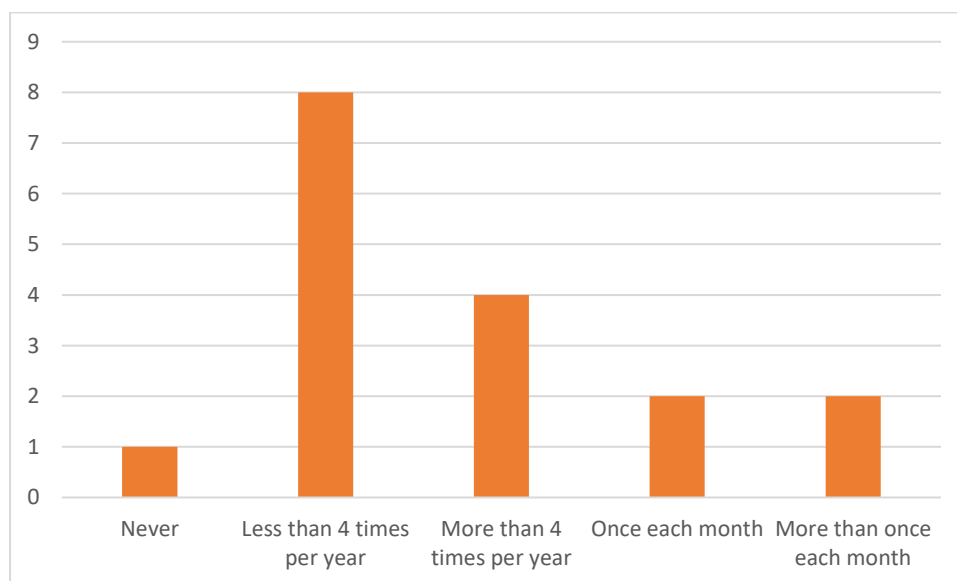
Then, a chi-square analysis was conducted to see whether there was a statistically significant difference between engagement and learning experience. The results indicated no significant association between the two variables ($\chi^2 = .94$, $p = .62$), suggesting that engagement does not have a statistically significant impact on learning experience.

Visit Frequency

Based on the amount of times that participants visit a museum yearly, a visit frequency score was given to each participant. High-scoring participants are those who go to a museum 4 times per year or more, and the low-scoring participants are those who go less than 4 times each year. 11 participants scored low on visit frequency, and 6 scored high. To understand the variance of the visit frequencies, a histogram was created showing the amount of times participants reported going to a museum. This is shown in Figure 4.

Figure 4

Reported Visit Frequency



As can be seen, most participants (N=9) report going to a museum less than 4 times each year or never, and are less-visiting. However, there is a little less than half of the participants (N=8) reporting to go more often than that, and those categorise as often-visiting. When comparing the learning experience scores of the children corresponding to the often-visiting versus less-visiting parents, this resulted in the information presented in Table 4.

Table 4

Descriptive Statistics for Learning Experience Scores Corresponding with the Often-visiting and Less-visiting Parents

N visit frequency score	M learning experience	SD learning experience
Often (N= 6)	0.50	0.73
Less (N= 11)	1.00	0.74

A contingency table was created with the data that was collected about learning experience and visit frequency score, which can be seen in Table 5.

Table 5

Contingency Table about the Engagement Scores and Learning Experience Scores

	Learning experience score 0	Learning experience score 1	Learning experience score 2
Less-visiting	3	5	3
Often-visiting	3	3	0

Then, a chi-square analysis was conducted to see whether there was a statistically significant difference between engagement and learning experience. No statistically significant effect of the visit frequency on learning experience was found ($\chi^2 = 2.22$, $p = .33$).

Visit Intention

In Table 6, a summary can be found of the high and low scorers for the different visit intention topics that were measured using a question with a scale of 1-10. Also, the mean score per topic is presented there to give an idea of the overall scores.

Table 6*Descriptive Statistics for the Different Intention Categories*

Topic	M score	SD score
Fun	9.29	0.99
Learning	7.59	1.58
Topics	6.71	2.57
Time	8.89	1.62

As can be seen in the table, the visit intention of fun scored the highest among the participants, followed by spending time together, learning possibilities and important topics. Each of the different topics could be separated into high-scoring and low-scoring groups, as described in data analysis. These high and low-scoring groups could be compared with the corresponding learning experience scores, which resulted in the information shown in Table 7.

Table 7*Comparing the Visit Intention Scores with the Corresponding Learning Experience Score*

Visit intention type	Score level	M learning experience	SD learning experience
Fun	High (N=11)	1.00	0.72
	Low (N=6)	0.50	0.74
Topics	High (N=11)	1.00	0.66
	Low (N=6)	0.50	0.73
Learning	High (N=10)	0.60	0.73
	Low (N=7)	1.14	0.90
Time	High (N=15)	0.80	0.72
	Low (N=2)	1.00	0.78

Then, Spearman's Rho test was used to see whether there is a statistically significant effect of the rating on each of these visit intention categories separately, on the learning experience score of the children. For the category fun, the correlation analysis suggested a weak positive relationship between the visit intention fun and learning experience. However, no statistically significant effect was found ($\rho = .22$, $p = .39$). This was the same for the visit intention topics ($\rho = .22$, $p = .39$). For the visit intention time, the analysis suggested a weak correlation between visit intention time and learning experience, but there was no

statistically significant effect between them ($\rho = -0.39$, $p = .12$). Lastly, for the visit intention learning, the analysis showed a moderate, negative correlation between visit intention learning and learning experience, where the p-value indicated that there was indeed a statistically significant negative effect of the visit intention learning on the learning experience of children, as the p-value was lower than the alpha of .05 ($\rho = -0.49$, $p = .048$).

Discussion and Conclusion

This research was conducted with the goal to find out more about three potential parental factors that could be of interest for future interventions aimed at improving the learning experience of children in museums. The factors that were included in the present research were engagement, visit intention and visit frequency. Through questionnaires and interviews as well as observations held in the Museum Fabriek in Enschede, data was collected with sets of parents and children in order to answer the research question: *Is there a relationship between parents' engagement, visit frequency, and visit intention and the learning experience of their children in a museum?*. There were three sub questions about the three independent variables (engagement, visit intention, and visit frequency) chosen for this report, and these will be discussed further, as well as the independent variable learning experience.

Engagement

For the independent variable engagement, it was hypothesised that the more engagement a parent takes part in with their child, the more their child learns. However, the results pointed out that there were no significant effects of engagement on the learning experience of children. This is surprising, since it was concluded in preceding studies that the engagement or interaction level between parents and children can have a significant and positive effect on children's learning (Puchner et al., 2001; Fender & Crowley, 2007; Munley & Center, 2012).

There are some explanations as to why there is a difference in results than what was expected. Firstly, it should be considered that it is possible that there is indeed no influence from engagement on learning experience. However, if we look at more closely at the results from the current study, it is apparent that parents were mainly engaging with their children by initiating contact with an exhibition, and by explaining their child something. The part of asking and answering questions to their child, was not done nearly as often. But in the introduction it was already discussed how important it is for parents to ask open-ended questions to their child, since this can make children feel of interest, it helps parents gain insight into the knowledge of their child, and it can positively impact the learning process of

a child (Wasik & Hindman, 2013; Tougu, 2021). Thus, potentially the parents did engage with their child in the current study, but it was not the most effective kind of engagement that was used. It could be that specifically engaging through asking open-ended questions should be encouraged more, and that that is what can positively influence learning experience.

Visit Intention

For visit intention, it was thought that specifically the intention of fun and learning could have a positive effect on learning experience. However, for the intentions of fun, time, and topics no significant effect was found, and for learning, the opposite effect was found, since it appeared that parents with a higher intention of learning for their children, actually had children with a lower learning experience score. Visit intention fun had a significant, negative effect on learning experience. This is striking, since in research the hypothesised effect was already found before. For example Falk et al. (1998) who found that visitors with high educational or recreational visit reasons had a positive impact on the amount of new things learned.

One way how this can be explained, is by realising that there were often parents who gave a high score to learning, but also to another intention, such as fun. Potentially, the parents were having the visit intention of learning, but the intention of fun (or another one) was stronger for them, and also influenced their child more. Furthermore, it needs to be considered that there is the possibility that parents give a higher score to visit intention learning than the true score they have in mind, which can also influence the results.

Visit Frequency

For visit frequency, it was expected that the higher the museum visit frequency of the parent, the higher the learning experience score of their child would be. However, no significant effects were found, even though prior research suggested the opposite. Tougu (2021) found that the motivation of the family to visit museums (how often they go to museums) can have positive effects on the interaction in the family, which can in turn have positive learning effects, as well as on the learning experience itself. However, in the current study both these effects have not been found.

It can be that the parents who were seen as often-visiting, self-reported a higher number of yearly visits than their true amount, as the data for this variable was largely based on self-reported measurement by the parents, which has been proven to sometimes be unreliable, especially when compared with objective measurements (Ababneh et al., 2023). In this specific study, one might expect that parents may indicate going to a museum more often than they actually go. This may cause that parents who do truly go to a museum often, are not

standing out in this study, since parents who do not go regularly are then included in the same often-visiting group, while they may have belonged in the less-visiting group.

Learning Experience

What has to be considered for the dependent variable learning experience, is that 17 children can be seen as a small sample size (MeasuringU, 2013), from which the results should not just be generalised for the whole population. Furthermore, this resulted in a smaller variance than hoped for. For example, there were only a few children relatively who scored a 2 on learning experience score, which leads to a small group that can be used for analysis. With a larger sample size in general, this would not have been the case, or to a lesser extent. The small sample size can be avoided in the future, by dedicating more time to data collection, or picking a larger museum with more visitors.

Furthermore, it can be said that the measurement for learning experience may not have been ideal, as children can have a hard time reporting what they have learned. They may simply not know how to describe what they have learned, or they may not remember, or they do not have the capability to reflect on their new knowledge. They can also find it scary to talk to a stranger, leading to short answers or not answering a question. Potentially a different way of measuring would have been more fruitful, e.g. a knowledge test or something else.

Further Limitations and Factors

Next to the aforementioned explanations specifically for each variable about the difference in expected and obtained results, there are also factors which could be of influence to the whole study in general. Firstly, the nature of the specific sample group in this study can be limiting, since all participants were gathered in the same museum, with most of them coming from the same city as well. That could limit the generalizability of the study further, since they all have a similar cultural background. People with different cultural backgrounds, have different learning preferences (Joy & Kolb, 2009). Therefore, the differences in results and learning experience could come from the fact that the participants in the current study are from a different country than the participants in another study.

Other factors may be of importance when it comes to the learning experience of children. For example, this could be the socioeconomic status of the family visiting the museum. Children with a lower socioeconomic status tend to receive less learning guidance from their parents and therefore their learning develops more slowly than children with a higher socioeconomic status (Schaw & Lew-Williams, 2016). Furthermore, it could be that the time spent at the exhibit should have been taken into account, since the children may have

learned more when they have spent more time at the exhibit, than children who have spent less time at the exhibit, simply because they also had more time to take in new information.

The design of the museum itself could also be a factor influencing the learning experience. For example, it could be that the museums in which the other studies took place, just had more information to offer or offered it in a different manner, which might be having a positive effect on the learning experience. Museums that use interactive features, for example augmented reality, are more enhancing to the child's learning experience than those who don't (Moorhouse et al., 2019). The Museum Fabriek uses some interactive features where children can for example touch things to see what happens, but other museums are potentially more interactive and therefore enhancing the learning experience, potentially explaining the difference in results that was found. It could be that the design of the museum is more important than the parent-child interaction, or that it influences the learning experience in some way, which was not taken into account in the present study.

Also, the individual differences present in children may be having an effect on their personal learning experiences. Each child is unique, and has a different personality. One example of how individual differences could impact the results, is found in a study by Choi and Cho (2020). They found that the level of focussing as well as the developmental stimuli that children receive at home, impact their learning motivation. In turn, this can impact the learning processes of said child (Choi & Cho, 2020). In the current study, the parent's motivation was one of the focusses, but maybe since the child's motivation level was not taken into account, we see no effect between motivation and learning experience. It can be imagined that other factors more specific to the children, can also have these impacts.

Another factor that could be impacting the results in this study, is how many times the participants had visited the Museum Fabriek before. It can be imagined that a child learns more the first time that they are in the museum, than the other times. Additionally, maybe a child who rarely visits a museum is more enthusiastic and eager to learn when they are visiting a museum, than a child who sees a museum every month.

Future Research

As the hypothesised effects were not found in the current study, other factors should be considered in the future. In general more research would be needed to find out whether the difference in effects in this study and other described studies is a coincidence, or whether this is something deeper that needs more investigation. As aforementioned, socioeconomic status, amount of visits to the same museum, museum type and individual or cultural differences between children may be affecting learning experience, and could therefore be important to

research further in the future. Socioeconomic status as well as time spent at the exhibit could easily be added on to a study similar to the present one, but potentially not with a questionnaire question, since that could be unreliable, but more so with an objective measure (income, do both parents work, etc.). That works similarly for the amount of times a child has been to the same museum before, as well as cultural background.

In how far the children's individual differences can make a difference, could serve as an interesting study on its own. One could do a form of personality or motivation testing, as well as measures for enthusiasm and learning experience. Like that, it can be suggested whether personality or motivation have a direct effect on learning experience, or maybe through enthusiasm. Moreover, it should be considered in the future to consult a measure for learning experience that is more child-friendly, so that the true amount of new knowledge can be considered when being compared to independent variables.

Furthermore, similar studies to the current one could be conducted in different countries and other museums, such as museums with more or less interactive features than the current one, to see if this has any other effect on the learning experiences from the children.

Conclusion

Even though the hypotheses in this research were not met, it can still contribute to its field of knowledge. Mainly, it shows that parental visit frequency, engagement and certain visit intentions are no guarantee for good learning experiences for their children. There are other factors included in the process, and those can be researched further. Museums still have the potential to educate and inspire children, and the knowledge that engagement, visit intentions and visit frequency are not the (only) factors playing a potential role in enhancing this learning potential, is a step further towards finding out more about which specific factors related to parent and child museum visits may be more important, and could be used for future interventions to get the most out of parent and child museum visits in the future.

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Appendices

Appendix A

Engagement observation list

What	Amount
Answer from parent to a question from their child	
Correcting a mistake	
Asking an open ended question to their child	
Initiating interaction without explanation (attention to something on the exhibition)	
Explaining to the child	

Appendix B

Questions for consent and demographics

1. Ik zag jullie net kijken naar die tafel daar, mag ik u en uw kinderen een paar korte vragen stellen voor mijn onderzoek, die anoniem zullen blijven? (Can I also ask you and your children a few short questions, which will remain anonymous in my research?)
2. Zijn jullie samen een gezin? (Do you form a nuclear family together?)
3. Wat zijn de leeftijden van jullie kinderen? (What age are your children?)
4. Zijn jullie allemaal Nederlands, of is er ook een andere achtergrond? (What is your background, Dutch or other?)

Appendix C

Visit frequency and intention questionnaire

1. Ik wil graag iets weten over het doel waarmee u het museum bezoekt. (I would like to know why you are visiting the museum today)
 - a. Op een schaal van 1 tot 10, in hoeverre kwam u hier met het doel de kinderen een leuke dag te laten beleven? (On a scale of 1-10, in how far did you visit the museum today so that the children would have fun?)
 - b. Op een schaal van 1 tot 10, in hoeverre kwam u hier met het doel om de kinderen wat nieuws te laten leren? (On a scale of 1-10, in how far did you visit the museum today so that your children could learn something new?)
 - c. Op een schaal van 1 tot 10, in hoeverre kwam u hier met het doel om uw kinderen informatie bij te brengen over specifieke onderwerpen die hier in het museum aan bod komen en voor u belangrijk zijn? (On a scale of 1-10, in how far did you visit the museum today so that your children could get some information about the specific themes which are important to you that this museum has to offer?)
 - d. Op een schaal van 1 tot 10, in hoeverre kwam u hier met het doel om tijd samen te spenderen als gezin? (On a scale of 1-10, in how far did you visit the museum today so that you and your family could spend some time together?)
 - e. Was er nog een andere reden of doel voor uw bezoek vandaag? (Was there any other reason for visiting the museum today?)
2. En hoe vaak gaat u zelf (alleen of met uw kinderen/andere mensen) naar een museum? (How often do you go to a museum yourself or with others?)
 - a. Nooit (Never)
 - b. Minder dan 1 keer per jaar (Less than one time per year)
 - c. 1 keer per jaar (Once per year)
 - d. Meerdere keren per jaar (Multiple times per year)
 - e. Minstens 1 keer per maand (At least once per month)

Appendix D

Learning experience interview

1. We staan hier vlakbij deze tafel met verschillende dingen erop, wat vond je het interessantste of leukste ding op deze tafel? (We are standing here next to a table with different things on it, what is your favourite thing on there?)
2. En heb je daar misschien vandaag nog iets nieuws over geleerd? (And did you learn anything about that thing today?)
3. Is er nog iets anders op de tafel waar je iets over geleerd hebt? (Is there something else that you have learned about?)
 - a. En wat dan? (And what did you learn about that?)
4. Is er iets anders in het hele museum waar je vandaag misschien wat nieuws over hebt geleerd? (Is there something else in the museum that you have learned something about today?)
5. Zou je nog meer willen leren over wat er op de tafel staat? (Would you like to learn more about the items on the table?)