WearTec Students’ Preferences and Perceptions of Formal vs. Informal Education

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The debate over whether in-class education or after-school education programs benefits the student more has been a major controversy with parents, students and educators. However, recent studies (Demson, Haley, Walktheart, & Householder, 2013; Feder, Shouse, Lewenstein, & Bell, 2010; Ramey-Gassert, 1997; Riedinger, Marbach-Ad, McGinnis, Hestness, & Pease, 2011) have provided information about these types of education, describing what is different in informal education, if students prefer informal education to formal education, or if informal education has more benefits than formal education.

In an informal education program, the way the classroom is run is somewhat different than a formal education program. The freedom and flexibility of an informal education program is what primarily makes these programs more attractive to both students and parents (Feder et al., 2009). Students “have a say” in what they believe is a good setup for the program, which allows informal education programs to be conversational and collaborative (Feder et al., 2009) including students of varying ages, interests, learning styles and prior knowledge (Ramey-Gassert, 1997). Students are also allowed more leisure than a formal education experience due to the fact that informal learning environments primarily focused on interaction and exploration (Kelly, 2000; Ramey-Gassert, 1997). Since informal education is less focused on tests and more on production of a product (learning) (Riedinger et al., 2011), informal education tends to also allow more leisure than a formal education experience due to the fact that informal learning environments including students of varying ages, interests, learning styles and prior knowledge (Ramey-Gassert, 1997). Therefore, the atmosphere of an informal education is much more relaxed than a formal education atmosphere (Riedinger, 2015; Ramey-Gassert, 1997).

In informal education programs, some teachers feel more prepared because it is a lower stress environment. Because some informal education programs are not mandatory, more of the students that attend informal education are students who actually want to be there (Riedinger et al., 2011; Kelly, 2000). In a summer robotics camp that took place at the informal education site, students even said that “they learned more in the camp than at school” when referring to science and technology” (Nugent, Barker, Grandgenett, & Welch, 2014). Generally, an informal education programs engage participants physically, emotionally, and cognitively, while having a strong impact on underrepresented students, primarily those underrepresented in science (Feder et al., 2009, p. 301). Most importantly, this type of program can positively influence children’s science learning in their and attitudes towards science, making it more likely that they will pursue science in their future jobs, hobbies, or even everyday pursuits in their lives because they thought the activities they did were “fun” and built the student’s confidence in science (Denson et al., 2015; Kelly, 2000). This is due to the fact that informal environments are more hands-on, experiential and personal towards the student (Ramey-Gassert, 1997).

In contrast to the students’ perceptions about formal education setting, the things that stood out the most to students in the after-school program were programming and learning new things. Most students (66.7%) thought that they learned more in the after-school program because of various reasons, but primarily because it was more challenging, were able to spend more time on the material, it was more fun because there was less pressure, and because they got to catch up on work. The students who preferred to learn in the after-school program (33.3%) did so because they felt it was more hands on and self-guided, and even “more and less strict.” Students enjoyed the fact that after-school programs were able to have more attention, time, and freedom to do what they wanted in regards to program, and they were also able to focus on troubleshooting and problem solving on the material learned in the formal classroom if needed.

Overall, there seemed to be a slight preference for learning in the after-school program, but not enough to highly affect the way the program was run. Students said that they would have preferred to learn a variety of times in the after-school program instead of the formal school environment like sitting and watching also more programming. Some students also said that they would have liked the material to stay the same or placed the majority of the material in the after-school program so they are still able to dedicate the time given in the formal classroom to their primary studies.

Limitations

This is a very limited sample and results cannot be generalized with all formal and informal school settings. These students are not representative of 11-14 year old students as this group was comprised of primarily highly gifted students in an afterschool education program participating in the larger WearTec study. The small sample size of this study does not allow for generalizability to the general population.

References


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Introduction

The students felt that they learned in the formal classroom setting (M=4, SD=1) (see Figure 1), and they also felt that they preferred to learn in the formal classroom (M=3.8, SD=1.2) (see Figure 3). Students also felt that they slightly preferred or were indifferent to learning in the after-school program as opposed to the formal classroom setting (M=1.2, SD=1.01) (see Figure 4).

Method

Participants

Study participants [n=15] consisted of students in grades 4-6 from suburban schools based on their participation in both the formal and informal education programs as a subset to another study called WearTec, where children use wearable technologies to study students’ attitudes towards technology and engineering by integrating electricity and circuitry into the project’s curriculum. Students were nearly evenly distributed by gender with 46.7% (7) female and 53.3% (8) male students.

Instruments

Students completed a single perception survey that gathered demographic information such as gender and age as well as a 4-item Likert-type survey that gathered students’ perceptions on a 5 (strongly agree) to 1 (strongly disagree) scale. The survey included items like “I learned a lot in the after-school program” or “I learned more in the after-school program than the formal classroom setting”. A follow-up, eight question interview was conducted with each participant to further investigate the students’ perceptions of formal versus informal educational settings. The way that the students responded to the items “I learned more in the after-school program than the formal classroom setting”, determined which follow-up questions the student received. These follow-up questions included items such as “Why do you prefer to learn in the after-school program?” or “Why do you prefer to learn in the formal school setting?”.

Procedure

Students who participated in the WearTec study regarding interest in STEM programs were able to work on their projects during both the normal school day (formal education) as well as after-school (informal education). The students who had experience at both programs were asked Likert-style questions to gauge their perceptions between formal and informal education systems within the WearTec study. From these responses, students were then interviewed with open-ended questions to probe for further information clarify their responses.

Discussion

In the qualitative results, the things that stood out the most to students in the formal school environment were coding and setting up Arduinos. This aligns with the curriculum which focused on the basics of coding and programming. Some students (33.3%) felt that they learned more in the formal school environment because there were more people in attendance, in formal school programs, because they were able to understand the material better by having more people off. The students who preferred to learn in the formal school environment (66.7%) felt that way because they learned more in the formal school environment, or if they knew that they are already required to be there for those hours, where the after-school program was optional.

Overall, there seemed to be a slight preference for learning in the after-school program, but not enough to highly affect the way the program was run. Students said that they would have preferred to learn a variety of times in the after-school program instead of the formal school environment like sitting and watching also more programming. Some students also said that they would have liked the material to stay the same or placed the majority of the material in the after-school program so they are still able to dedicate the time given in the formal classroom to their primary studies. The small sample size of this study does not allow for generalizability to the general population.

Results

This is a very limited sample and results cannot be generalized with all formal and informal school settings. These students are not representative of 11-14 year old students as this group was comprised of primarily highly gifted students in an afterschool education program participating in the larger WearTec study. The small sample size of this study does not allow for generalizability to the general population.