

4-2016

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

Sarah Houston

University of Nebraska-Lincoln, shouston@huskers.unl.edu

Gwen Nugent

University of Nebraska-Lincoln, gnugent@unl.edu

Follow this and additional works at: <http://digitalcommons.unl.edu/ucarersearch>

 Part of the [Educational Methods Commons](#), [Gifted Education Commons](#), and the [Science and Mathematics Education Commons](#)

Houston, Sarah and Nugent, Gwen, "WearTec Students' Preferences and Perceptions of Formal vs. Informal Education" (2016).

UCARE Research Products. 66.

<http://digitalcommons.unl.edu/ucarersearch/66>

This Poster is brought to you for free and open access by the UCARE: Undergraduate Creative Activities & Research Experiences at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in UCARE Research Products by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

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

Sarah Houston | Faculty Advisor: Dr. Gwen Nugent | University of Nebraska-Lincoln

Introduction

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 (Denson, Hailey, Stallworth, & Householder, 2015; Feder, Shouse, Lewenstein, & Bell, 2009; Ramey-Gassert, 1997; Reidinger, 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 consensual 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 allow students to have a better chance at learning without negative factors like self-esteem or overcritical peers or teachers potentially affecting a student's participation and overall learning (Feder et al., 2009). The intention of an informal learning environment is for the feel to be more engaging, motivating, enjoyable and nonthreatening (Ramey-Gassert, 1997). Therefore, the atmosphere of an informal education is much more relaxed than a formal education atmosphere (Kelly, 2000; Ramey-Gassert, 1997).

Informal education has a much different effect on students than formal education (Riedinger et al., 2011). In informal education settings, 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 University of Nebraska, 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 school and their 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 reason that informal environments are more hands-on, experiential and personal towards the student (Ramey-Gassert, 1997).

Method

Participants

Study participants (n=15) consisted of students in grades 4-6 from suburban schools based on their participation in both formal and informal education programs as a subset to another study called *WearTec*, whose goal is to 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 ranging from eleven to fourteen years of age with an mean age of 12.13 years.

Instrumentation

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 students rated their perceptions on a 1 (strongly disagree) to 5 (strongly agree) 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 question "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 environment?".

Procedure

Students that participated in the *WearTec* study regarding interest in STEM programs were able to work on their projects during both the normal school day (formal environment) as well as after-school (informal environment). 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.



Figure 1: I learned a lot in the formal classroom setting.



Figure 2: I learned a lot in the after-school program.

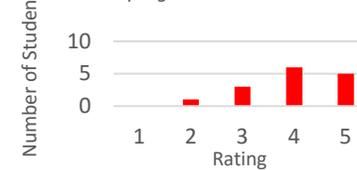


Figure 3: I learned more in the after-school program than the formal classroom setting.

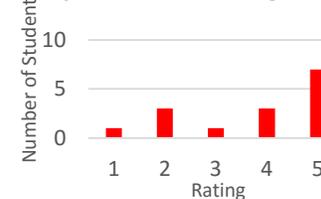


Figure 4: I prefer to learn in the after-school program.



Results

The students felt that they learned in the formal classroom setting (M=4, SD=1) (see Figure 1), and they also felt that they learned in the after-school program as well (M=4, SD=0.93) (see Figure 2). However, more students felt that they learned more in the after-school program than the formal classroom setting (M=3.8, SD=1.42) (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=3.2, SD=1.01) (see Figure 4).

Discussion

In the qualitative results, the things that stood out the most to students in the formal school environment were coding and setting up Arduino. 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, so they were able to understand the material better by bouncing ideas off more people. The students who preferred to learn in the formal school environment (66.7%) felt that way because they believed they were "more productive in the formal environment" and knew that they are already required to be there for those hours, where the after-school program was optional.

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 fun 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 the *WearTec* study. 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 things in the after-school program instead of the formal school environment like crafting and sewing, and 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 affluent suburban school district participating in the larger *WearTec* study. The small sample size of this study does not allow for generalizability to the general population.

References

- Denson, C. D., Hailey, C., Stallworth, C. A., & Householder, D. L. (2015). Benefits of Informal Learning Environments: A Focused Examination of STEM-based Program Environments. *Journal of STEM Education: Innovations and Research*, 16(1), 11.
- Feder, M. A., Shouse, A. W., Lewenstein, B., & Bell, P. (2009). *Learning Science in Informal Environments: People, Places, and Pursuits*: National Academies Press.
- Kelly, J. (2000). Rethinking the elementary science methods course: A case for content, pedagogy, and informal science education. *International Journal of Science Education*, 22(7), 755-777.
- Nugent, G., Barker, B., Grandgenett, N., & Welch, G. (2014). *Robotics camps, clubs, and competitions: Results from a US robotics project*. Paper presented at the Proceedings of 4th International Workshop Teaching Robotics, Teaching with Robotics & 5th International Conference Robotics in Education Padova (Italy) July.
- Ramey-Gassert, L. (1997). Learning Science beyond the Classroom. *The Elementary School Journal*, 97(4), 433-450. Retrieved from <http://www.jstor.org/stable/1002356>
- Riedinger, K., Marbach-Ad, G., McGinnis, J. R., Hestness, E., & Pease, R. (2011). Transforming elementary science teacher education by bridging formal and informal science education in an innovative science methods course. *Journal of Science Education and Technology*, 20(1), 51-64.