

THE SCIENCE OF SUMMER CAMPS

Abstract

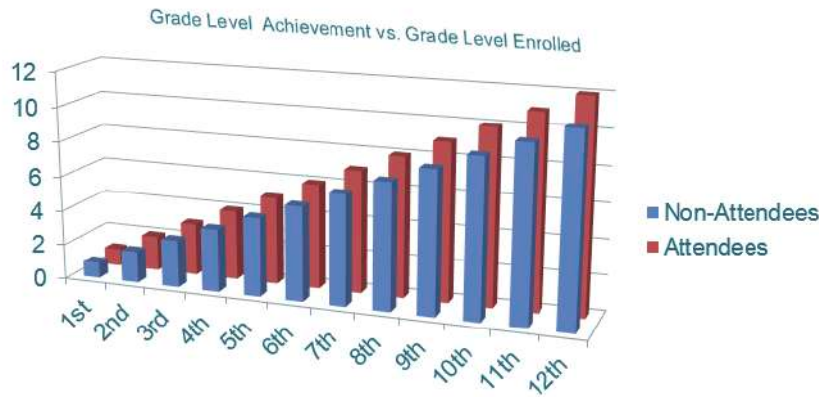
Summary of the detriment of summer vacation on K-12 students, and how to remedy this learning loss. Extracurricular opportunities such as summer camps have the ability to fill the education gap and solve the issue at hand.

The Science of Summer Camps: *why are they important?*

As more and more studies are being conducted to discover the best methodology for teaching K-12 students, interesting light has been shed on the detriment of summer vacation. While the concept of summer break was initially meant to standardize the number of months in school between rural and urban students, research from the last 100 years shows it does more harm than good (McCombs, Augustine, Schwartz, Bodilly, Mcinnis, Lichter, Cross, 2011). Not only does this gap cause students to start each school year approximately a month behind where they left off the previous year, but they have lessened mental retention abilities and lower test scores (McCombs et al., 2011). Together, these detrimental effects build each year creating noticeably lower achievement levels amongst students (Cooper, Nye, Charlton, Lindsay, Greathouse, 1996). However, this issue has a viable solution: supplemental summer education programs.

Benefits & Side Effects

As mentioned earlier, lack of educational material in student's lives during summer vacation leads to lowered mental retention abilities. However, this academic gap does not affect the retention of all subject matter equally. Students lose more easily math skills and knowledge than reading ability (McCombs et al., 2011) (Cooper et al., 1996). As indicated in the graph, each year that students do not participate



in supplemental summer education, the more their cumulative Grade Level Achievements fall. *Making Summer Count* authors McCombs et al. (2011) state, "all of these types of summer learning programs can mitigate summer learning losses and even lead to achievement gains." As STEM education is being more heavily focused on earlier and earlier in K-12 education, educators seek supplemental programs to help provide their students with greater opportunities (Krishnamurthi, Ottinger, Topol, 2010). In *The Effects of Summer Vacation on Achievement Test Scores*, Cooper et al. conclude the results of the experiment, "indicate that summer loss was more dramatic for math-related subject areas than for reading or language." Similarly, Cooper et al. (1996) also believe that "summer school programs might best focus on instruction in mathematics." What this research tells us is a heavier focus on STEM-based subjects is needed to fill the education gap experienced during the summer vacation months.



In response to the growing need of STEM learning in the early classrooms, authors Krishnamurthi et. al (2010) of *STEM learning in Afterschool and Summer Programming* make the claim, "It is becoming clear that there is a great need - and a prime opportunity - to tap the potential of afterschool

and summer learning programs to serve an urgent national priority to enhance STEM education." Responding to the needs of STEM education, PCS Edventures provides a series of STEM-based summer camps which introduce concepts such as genetics, structural engineering, and the study of statics. These camps also incorporate 21st century skills to prepare young students for a technologically advanced future. Such skills include communication, critical thinking, problem-solving and more. Camps offered proved an opportunity to help improve the educational careers of K-12 students. With mental stimulation during their break from school, students are more likely to have better mental retention, develop a deeper interest in such subjects and benefit from the effects of academic summer programs long-term.

Educational summer programs such as academic camps have long-lasting positive effects on students in the K-12 age range. McCombs et al. (2011) found that benefits of summer programs can last as long as two years after, but the effects could have longer-standing results which are difficult to test. Authors of *Planning Early for Careers in Science* Tai, Liu, Maltese and Fan (2006) suggest that participation in summer camps can help to spark interest in areas they may not have the opportunity to explore otherwise, specifically STEM. Tai et al. claimed, “our study does suggest that to attract students into the sciences and engineering, we should pay close attention to children’s early exposure to science at the middle and even younger grades.” In addition, the authors also found that most science was not learned in traditional school settings, and students which have the opportunities to participate in STEM learning are more likely to excel and pursue STEM-based career fields. Students that have shown that an interest developed in STEM by the 8th grade is a better indicator of pursuing one of these fields than high test scores (Tai et al., 2006). What this indicates, is that although summer camps have the ability to improve test scores, the opportunity to be exposed to new topics can influence students on a much deeper level.



The summer camps which Edventures produces for students provide opportunities to learn about a variety of STEM topics and spark their interest at a young age while in a flexible and non-traditional classroom setting.

Edventures works with students in new, innovative ways to introduce STEM topics and help to instill an appreciation and understanding of such subjects. The summer camps which Edventures produces for students provide opportunities to learn about a variety of STEM topics and spark their interest at a young age while in a flexible and non-traditional classroom setting. Krishnamurthi et al. (2010) also claimed, “quality programs can lead to increased interest and improved attitudes toward STEM fields and careers, increased STEM knowledge and skills, and increased likelihood of pursuing STEM majors and careers.” Similarly, in *STEM Learning in Afterschool and Summer Programming*, authors Wai et al. (2010) stated, “accomplishments in STEM appear to emanate from rich talent development opportunities experienced early in life.” Essentially, all benefits of students participating in extracurricular summer camps translate into a more effective early educational career and more prosperous higher education prospects.

Conclusions

Research studies indicate that students which do not participate in academic summer camps lose potential educational opportunities, mental retention abilities and cumulative academic achievement levels per grade. Edventures has developed a series of programs to meet the identified issues from the research related to summer learning deficit. With a rising need for increased STEM education across the world, Edventures has identified a viable and simple solution to the emerging problem. In addition to increased school performance standards, camps such as those developed by Edventures have the ability to inspire more young students to pursue STEM in higher education, creating the technologically equipped generation necessary for the 21st century.

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