Creating an Environment for Millennials

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Abstract. Millennials, individuals born between the years 1978 and 2000, are advancing from colleges and universities to the workplace. The traits and characteristics of this generation are widely studied and categorized. Previous work demonstrates that Millennials have difficulty pursuing objectives that require critical thinking skills. We designed and deployed a one week program to aid Millennials in developing critical and free thinking skills. Our program scaffolds learning using a resource rich laboratory environment. We allowed them free reign over any and all available resources to work or build with as they pleased. Throughout the process, we followed progress, offered advice, and noted instances when group actions paralleled documented Millennial behaviors. Participants documented their learning process in a comic book style poster to further our ability to understand their progression.

1 Introduction

As technology advances and home environments shift throughout the years, generational learning styles and workplace skills alter along with the rising students that progress through the higher education environment. Most recently, Millennials, individuals born between the years 1978 and 2000, have been advancing through colleges, universities, and into entry level workplace positions, where they seem to have some difficulty adhering to conventional workplace policies and pursuing objectives that require critical thinking skills. These traits and characteristics of the incoming generation have been widely studied and categorized, and a general synopsis of the findings of other research groups has been included as background for our findings. In order to pinpoint any weaknesses and partially combat them, we as a computer science and emerging technology laboratory at Texas A&M University took part in an engineering camp, called ENGAGE (ENGineering Aggies Gaining Experience). The camp is based on knowledge gained through hands-on learning experiences, and its participants are chosen from a selection of applications received from high school students who meet eligibility qualifications, which outline that the students must have GPAs of 3.5 or above and must be entering 10th or 11th grade, though it is clearly stated that "… priority will be given to students of ENGAGE partner high schools and students from underrepresented groups…" (ENGAGE Summer Camp, n.d.). Our particular goals for the weeklong camp were to enrich the students' familiarity with new types of technology as well as allow them to develop critical thinking skills by placing them in a resource rich open-ended laboratory environment. Throughout the process, we

followed their progress, offered advice, and noted instances when the actions of a student group paralleled with behaviors, based on thorough research, that Millennials are known to demonstrate. We asked them to document their process in the form of a comic book style poster, and paired with our observations we were able to ascertain some faults as well as some strengths in the thought development of these students, all of which were in the upper end of the age range of Millennials. Our attempts to repair problem areas in student abilities and their reaction to these efforts were also under observation and provided insight into what kind of changes could be made in the educational and workplace environments in order to support student growth and achievement.

2   The Definition of Millennials by Birth Year

Generations by year			
Generation Y	Generation Z	Millennial	Source
		1982-present	Monaco and Martin (2007)
	1995–2012		Singh (2014)
1978–1990	1990–2000	1978–2000	Tulgan (2013)
		1982–2003	Keeling (2003)
		1982–2002	Roehl et al. (2013)
		1981–1999	Nicholas (2008)
1982–2004	2005-present	1982–2004	Strauss and Howe (1991)

Millennials are defined in various, depending on the experimental group involved, and this can be problematic when researching the generational learning and development styles of various age groups. In order to clearly define the birth years and ages of the students described in our research, we have taken the ages of Millennials to be those born between the years 1978 and 2000. This vast span is then subdivided into two categories; Generation Y, those born between 1978 and 1990, and Generation Z, born between 1990 and 2000. This definition, as described by Tulgan (2013), is useful for our purposes because it allows us to both generalize traits across the board as well as utilize more specific descriptions as described in other research articles. Below is a small set of sources and their internal demarcations of the generational spans, including the much-cited Strauss and Howe book, *Generations: The History of America's Future, 1584 to 2069*, which, while insightful into the mental processes of the generation, contrasts drastically in its classification of the generations.

3   Helicopter Parenting

When addressing the issues and strengths of the Millennial generation, it is worth noting the increasing phenomenon of helicopter parenting. This interesting occurrence "…refers to an overinvolvement of parents in their children's lives…" (LeMoyne and Buchanan 2011), especially during the formative years. This, in turn, creates a new

breed of learners and students, as "…parent-driven scheduled lifestyles with little "free" time characterizes the childhood of Millennials. This regimented schedule of extra-curricular activities has decreased opportunities for independent creative thought and decision-making skills and provides challenges for both employers and educators…" (Monaco and Martin 2007). These heavily involved parents, and therefore the students themselves, demand more than ever that schools are held to the highest standards of accountability for the services they provide. (Keeling 2003) Students who have been monitored and hand-held through their entire childhood, and "…isolated and scheduled to a degree that children have never been…" (Tulgan 2013), may have a more difficult time transitioning to the lifestyle of a traditional college student, where self-direction and critical thinking skills are a must. This difficulty could be attributed to the massive amounts of "…protection and direction from parents, teachers, and counselors…" that students were exposed to prior to entering the higher education environment (Tulgan 2013).

4 Standardized Testing

Standardized testing, where tests are created to be taken by all students of a specific skill level and are then scored in a standard manner, have been implemented in all fifty states in the US. These tests are the basis of "…grade promotion and graduation to school funding. By degrees, standardized testing is becoming just about the only measure of academic quality that really counts in many school systems…" (Keeling 2003) Because of this, teachers are utilizing time in class to teach to the test, as well as educate students on test-taking abilities, which places a larger emphasis on the structure and learning goals associated with the test itself. This, in turn, fosters a type of learning that follows a list of skills to master and schedules the learning pattern of students into a streamlined path which must be followed in order to proceed. By organizing the educational system into a series of prewritten goals, independent learning, critical thinking, and free thinking skills are inhibited, leaving students at a disadvantage if they then enter into the higher education or workplace environments.

5 Millennial Traits

Due to external influences such as standardized testing and the integration of technology into everyday life, Millennials, especially Generation Z, have developed their own unique set of traits that characterize their generation. These traits are detailed by Strauss and Howe, and can be compressed down to a concise list; Millennials are special, sheltered, confident, team oriented, achieving, pressured, and conventional. By expounding on each of these traits, we can observe the byproducts of the internal strengths and weaknesses of this generation, and can possibly research strategies that attempt to adapt the higher educational environment in order to better suit incoming students.

As listed in *The Millennial Student: A New Generation of Learners* (pg. 44), each attribute of this generation plays a role in their performance in the classroom. They perceive themselves as special, and are accustomed to rewards for participation; they have been sheltered, and work best in a structured environment with a strict set of well-followed rules. While they may show signs of independence, they work well in groups and tend to be inherently socially active, a consequence of continuous interaction through media and online resources. Though their high level of optimism due to their confidence causes them to want to have a hand in the creation of their own knowledge, they also require feedback every step of the way. They perform well when being judged, but if told they do not meet preset standards they will challenge the grading process and the validity of the verdict (Monaco and Martin 2007). These characteristics of the Millennial learner branch further into classroom applications and the consequences of removing or adding different applications.

Millennial students, as noted by workplace professionals and university level educators, are most well acquainted with being spoon-fed information (Keeling 2003). As a result, they have not been given the opportunity to develop a large range of critical thinking skills, and require clear instructions as well as feedback in order to continue their assignment or project, and as stated in Advising the Millennial Generation, "… these students may want a major chosen for them rather than by them… "…students demand that 'everything is spelled out' in detail and have trouble thinking for themselves."…" Even when supplied the safety net of direction, Millennial students still "… thrive on constant feedback and become paralyzed, often unable to proceed forward, without feedback and direction…" (Monaco and Martin 2007). As a method meant to combat this paralysis, it has been highly suggested that educators give clear expectations in the course syllabus regarding assignment due dates, test dates, evaluation methods, and required prerequisite knowledge.

6 Project Methods

Our project consisted of a weeklong camp centered on a technology rich lab environment. Twenty high-achieving high school aged students were selected to participate in the program. The technologies available to them included 3D printers, movement detectors, and remote controlled drones. Students were instructed to begin a self-directed group project given these technologies and to document their progress via comic book-style poster boards. As a bonus designed to promote motivation among the students, guest speakers were invited to talk about and demonstrate their own self-directed projects. These methods promoted an environment of self-rewarding behaviors centered around learning and research, and because we encouraged them to work in groups it also fostered a collaborative and cooperative aspect to the project. Because they were able to work hands-on with all the technologies being introduced to them, their learning environment required interaction, and their evaluation method of their own project was left open to interpretation, so long as they recorded their progress on the posters by the end of the week.

Classroom application	Did we?
Provide rewards for individual and group work	No
Provide feedback	Yes
Teach to self-reward	Yes
Learning centered syllabus	Yes
Clear instructions and expectations of assignments	Yes
Course calendar with test and assignment dates	No
Daily lesson learning outcomes	No
Collaborative learning	Yes
Cooperative learning	Yes
Interactive learning	Yes
Opportunities for in and out of class social learning activities	No
Provide clear definitions and paths to success in class	Yes
Include variety of technology in teaching and assignments	Yes
Link content to "real life" applications	Yes
Provide feedback in various forms including technological means	No
Timely feedback	Yes
Simulations and case work through technology and non-technology instructional delivery	Yes
Develop well defined grade appeals policy	No
Integrate a variety of valid evaluation methods	Yes
Utilize problem solving by integrating sociological situations from a variety of cultures	No

Classroom applications for Millennial students (Monaco and Martin 2007); italicized were not implemented during our research.

7 Project Results

Participants had difficulty beginning their projects, but with continuous feedback were able to confidently work in a self-directed environment. Allowing them to interact with completed past projects aided them in moving forward, and building a visual representation of their process helped support their faith in the trial-error method of production. During the first day, many students were notably "lost", and continuously requested step-by-step direction. By the end of the second day, about half of the students had formed groups around technologies that they found interesting or useful. A guest speaker, who had built a motorized longboard on his own time, came to speak on the third day; the motivation and excitement caused by the guest speaker were noticeable, and energy in the laboratory increased exponentially. Between the last two days, all students became somewhat engaged in at least one of the resulting self-directed projects, and on the last day, students were given a presentation centered on remote controlled drones our laboratory built using the 3D printers versus a commercially bought drone. The students put together their presentation posters, and most

notably the majority of the posters centered on the comradery of the groups, the resulting discussions, and the guest speaker presentations. We noted that some students were reluctant to record their failures, which led us to believe that more positive feedback for failing and moving forward would be necessary for such an environment.

8 Conclusion

Throughout our experiment, we found that positive feedback for moving on after a failure and generalized feedback on students' methods were the best ways to create an environment in which students were able to thrive. Notably, working in groups to provide collaborative interaction suited the students well, and maintaining energy by providing examples of others' success were also key components of student success.

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