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A Proposed Remaking of the American Education System

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A Proposed Remaking of the American Education System

by

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Abstract

The number of high school students who want to attend college has increased in the United States. However, students frequently do not feel adequately prepared for the rigor of college coursework. The purpose of this study was to examine how well current college students perceive their high school prepared them for college. Thus, a survey study was done to examine how students feel about the different school subjects commonly offered both in the United States and internationally. Significant results were found in this study showing that students were exposed to and knew the various subject domains at varying levels, students reported using certain subject domains more depending on their career path, and students wish they knew more about many of these same subject domains prior to attending a post-secondary institution. The findings of this study showed that adopting a model of education based on the Swedish and Norwegian educational systems may be beneficial to students in the United States.

Keywords: education, curriculum, learning

A Remaking of the American Education System

In the United States, high school students' aspirations for college seem to be higher than ever (Roderick et al., 2009). Many students desire or feel the need to pursue a college or university degree in order to ensure their future success. However, many students do not feel prepared for the difficulties of the college curriculum. A recent study showed that only 64% of students who started at a 4-year college or university in 2014 graduated within 6 years, which is 150% of the expected graduation time. Similarly, only 34% of students at a 2-year institution in the class of 2017 graduated within 3 years (U.S. Department of Education, Institute of Education Services, 2022). While some students do not graduate due to financial or personal reasons, for many students, the academic challenges of college are too difficult of a step up from that of high school. One of the main reasons for this is the sheer difference in expectations.

College instructors expect students to use higher-order thinking, interpret results, draw inferences, solve complex problems, and conduct their own research on topics in a way to which students have not previously been introduced. They are expected to be independent learners while working with other students to learn the material, which are new practices for many students (Conley, 2007). With all of these expectations, the high school curriculum must prepare students to meet these challenges. However, oftentimes, high schools disregard practices that would better prepare students for college and opt for their own standards. Frequently, high school becomes more about students obtaining the required number of credits rather than preparing students for going into a field of interest (Wickli, 2018). High school should require students to show understanding and mastery of material. It should be a place where students are encouraged in higher-order thinking to prepare them for college and life after graduation in their chosen field.

United States Curriculum

The current United States pre-college education system takes the form of elementary school/primary school, followed by middle school, and then high school ("Structure of U.S. Education," 2008). Students usually spend four to five years in elementary school, three to four years in middle school, and four years in high school. Students generally study the subjects of English, math, science, and social studies with some opportunity for electives throughout these phases of school, incorporating harder material as the students cognitively develop.

In 2010, the United States began adoption of the Common Core State Standards Initiative, or Common Core. Common Core is an educational initiative detailing what students should know in the fields of math and English Language Arts (ELA) at the conclusion of each school year. The fields of science, social sciences, other humanities, and the arts are not incorporated into this curriculum standard.

Due to the tenth amendment, stating that powers not delegated to the federal government are reserved for the states, education is a function of the state government. With this, many states have implemented their own set of standards rather than adopting the Common Core standards recommended by the federal government. This has led to differences in college readiness due to the differences in curriculum requirements. Rather than focusing on curriculum development, many states have adopted graduation requirements for high school students of generally three to four credits in English and two to four credits each in math, science, and social studies/social sciences ("College - Resources - Diploma Options," 2022; "High School Graduation Requirements," 2015; "State Minimum High School Graduation Requirements," 2023). For each of these, one full credit represents two semesters of a class or a full year in school. For many students, the specific material of these subject domains are first introduced in elementary or

middle school and reintroduced in high school with more depth, so students end up relearning the same material multiple times throughout their academic career.

However, this forced breadth and depth of subject matter keeps students from pursuing subject matter that they are interested in learning and pursuing a career in. It keeps students from taking an interest in their learning and seeking to become independent learners, as they will be expected to do in college with their major. This educational set up and broad curriculum should be changed in order to better prepare students for both college and life after high school.

Other Studies

In the United States, there are increasing numbers of students who are pursuing a college education after high school. However, a study found that there is a gap between the increasing number of students who want to attend college and college completion (Roderick et al., 2009). Thus, high schools should focus on equipping students with the proper academic skills to complete college coursework. Colleges typically focus on a few indicators, such as standardized test results, grade point averages, and class ranks when assessing students' college readiness. However, by only looking at these indicators, it was found that less than a third of students were ready for college. Therefore, it is imperative that high schools are held responsible for preparing their students for college. High schools should change the system by raising standards for students to graduate with measurable levels of college readiness in order to ensure that high school graduates are ready for the rigor of college coursework.

About 90% of high school freshmen in the United States expect to complete post-secondary coursework, but a majority of them are not prepared to do so because the students are not aware that they need a different set of skills and knowledge to complete post-secondary coursework than needed in high school (Leeds & Mokher, 2019). Additionally, there are disparities among high school graduation requirements and post-secondary education

requirements. Thus, some states have made efforts to implement policies that would decrease the gap between secondary and post-secondary education (Mokher & Jacobson, 2019). Many states only define college readiness by academic knowledge, social skills, and involvement in the community. However, in the state of Florida, college readiness exams were distributed to all mid-performing Grade 11 students. This exam was developed by both K-12 and higher education educators to determine if students are prepared to enroll and succeed in post-secondary education without remedial education. Students who do not meet the benchmark on this exam enroll in college readiness courses in Grade 12.

On a positive note, interviews with secondary and post-secondary educators revealed that both secondary and post-secondary educators would like to establish more collaboration between the two levels of schooling to better prepare students for post-secondary education. However, collaboration between secondary and post-secondary programs typically focuses on higher-performing students, not those needing remedial assistance, again leaving lower-performing students unprepared for the demands of college (Mokher & Jacobson, 2019).

Other Curricula

The Swedish educational system consists of nine years of compulsory school for primary education followed by an optional three years of upper secondary education in one of 18 national programs (“Education Structure of Sweden,” 2023). Students must begin school at the age of six in either the pre-school system or the primary school system, and they are required to finish the full nine years of primary school consisting of the lower level, intermediate level, and upper level. After students finish primary school with satisfactory results in Swedish, English, and math, they can apply to an upper secondary school program in either preparatory or vocational education. These programs either prepare them for further education at the collegiate level, at the

equivalence of roughly an Associate's degree, or a career in a vocational field such as building and construction, IT, and healthcare.

The Swedish educational system aims to provide every student with academic knowledge and the desire to learn more as soon as they start school ("About Swedish Schools and Education," 2022). Teachers focus on helping every student achieve their fullest potential no matter their background or circumstances. Additionally, teachers provide the content that students need to learn as well as different methods in which the students may learn the content. The teachers have their responsibilities in the Swedish education system, but students have responsibilities as well. Students are expected to learn how to think critically about the world around them and ask questions that would contribute to their understanding of the world. In primary school, students are assessed in each school subject to provide feedback to both the student and guardian for them to understand how the student is doing in school. Furthermore, after pre-school, every student has the opportunity to meet with a study and career advisor who will provide information and guidance that would help students plan for their futures. In Swedish primary education, students under 13 years of age may go to recreation centers to develop social skills, encourage creativity, and engage in physical activity.

Since students in Sweden are encouraged to seek knowledge from a young age, the design of Swedish high schools provides every student with academic knowledge and encourages students to learn more ("About Swedish Schools and Education," 2022). Furthermore, the Swedish high school design allows students to be more flexible in their academic study. In the Swedish school system, the academic structure is built around the needs of each student, such as students having access to education in the language with which they are most comfortable. Additionally, high school students must prepare an individualized study plan

with their teachers that will be utilized throughout the rest of their secondary education. The student, teacher, and guardians have meetings regularly to discuss student performance in the classroom and how they can further improve their education. If students are at risk of not reaching the objectives set for their education, they may receive additional support from their teachers to help reach those objectives and goals.

Early education in Norway is split in two parts: primary school and lower secondary school. Students attend primary school for seven years and lower secondary school for three years ("General Information About Education in Norway," 2023). During these early years of education, students are required to attend school with the goal that every student will acquire common knowledge, cultural understanding, and learn how to navigate academic challenges. Thus, every student has the opportunity to acquire knowledge and skills necessary for them to succeed starting in early education. Since the goal of primary education in Norway is to expose students to all school subjects, no grades are assigned to primary school students. On the other hand, lower secondary school students are given grades twice a year, and they are given a certificate with their assessment grades after they complete lower secondary school to demonstrate their capability to attend upper secondary school.

In Norway, after students have completed primary and lower secondary school, students may move onto high school. High school students, or upper secondary students, have the opportunity to further their education for another three years to prepare them for higher education (general studies) or obtain vocational certificates ("General Information About Education in Norway," 2023). Both students in the general studies track and the vocational track can choose between different programs that focus on specific areas of study or trade. For students on the vocational track, they typically complete two years of school and one to two

years of an apprenticeship. However, if students on the vocational track decide that they want to pursue higher education, they may take a supplementary general studies program to receive their general studies admissions certificate.

Learning Theories

There are many developmental and learning theories that have been proposed to be beneficial to students. Dr. Maria Montessori was a physician and educator who developed the Montessori Method. The Montessori Method aims to develop both intellectual and social skills of every student (Mendoza et al., 2021). In order to achieve this, the Montessori Method aims to promote independence and freedom in students. Classrooms that utilize the Montessori Method maximize the opportunity to learn for every student. Furthermore, students are encouraged to engage in self-directed learning with less teacher intervention as student development progresses. Thus, Montessori classrooms are designed in such a way that there are different stations to fit the different educational and developmental needs of students.

Students educated within the Montessori Method are encouraged to be curious about the world around them because they have the opportunity to discover things in the concrete world for themselves. Students may move from station to station to work independently or in groups with peers. Additionally, students are separated into age ranges in their classrooms to promote cooperation among their peers and the desire for further intellectual, social, and emotional development. Therefore, students in Montessori classrooms become independent learners in a nurturing environment where teachers provide assistance to enrich learning in their students (“What is Montessori Education?,” 2023). Since students are self-directed and are given the freedom to question the world around them, students become self-motivated, are able to make connections to the world around them, and think critically and deeply about topics.

The Montessori Method is widely utilized to develop students intellectually, socially, and emotionally. Albert Bandura brought forth another theory that aims to further student development: self-efficacy. Self-efficacy can be defined as the belief an individual has about their capability to complete a task or achieve a goal ("Self-Efficacy Teaching Tip Sheet," 2023). Self-efficacy has been found to have a significant impact on the thoughts, emotions, motivations, and behaviors of individuals. Previous studies have shown that self-efficacy is strongly linked to academic achievement and future career choices (Webb-Williams, 2017). Therefore, fostering a strong sense of self-efficacy produces more engaged and academically successful students because they learn to persevere and be self-motivated when completing tasks in and out of the classroom. Furthermore, students with strong self-efficacy set goals that they believe are achievable, and thus, they have the motivation to achieve those goals. Students must have the motivation to achieve their academic goals, and instructors may foster this sense of self-efficacy by engaging students in learning. Thus, when instructors engage students in learning, students develop greater self-efficacy, which would increase their academic performance.

Current Study

Given the noted disparities in curricula and educational standards, we wanted to examine students' perceptions of their high school education and how well it prepared them for college. Thus, the current study asked students at The University of Alabama in Huntsville (UAH) to take a survey and provide their views on how well their high school education prepared them for college across several domains. At UAH, science, technology, engineering, and math (STEM) are highly valued since a significant number of students are majoring in these subjects. Thus, the participants in this study may be more prone to focus on and value STEM subjects since UAH is more STEM focused.

Method

Participants

The participants of this study consisted of students enrolled in introductory psychology courses at UAH. Participants ($N = 237$) signed up to participate in this study in order to earn course points toward their psychology course grade. Out of these participants, 18 did not complete the study, 21 did not consent for their data to be used in the study, 2 had multiple completions, 13 were not enrolled in high school when the new curriculum was implemented, 3 attended high school outside of the United States, and 1 was not enrolled in high school when the new curriculum was implemented and attended high school outside of the United States. After excluding these participants' data, 181 participants who had completed the study, consented to their data being used and met the criteria for being included in the study were included in the reported analyses. This study was approved by the Institutional Review Board (IRB).

The participants spanned six different colleges and were from four different classes. As may be seen in Figures 1 and 2 below, most of the participants were from the College of Arts, Humanities, and Social Sciences (AHSS), the College of Nursing, and the College of Sciences, with fewer students from the College of Education, the College of Engineering, and the College of Business participating. Most reported that they were freshmen or sophomores, with fewer juniors and senior students participating in the survey. Out of all of the participants, 64.6% of participants identified as female, 28.7% of participants identified as male, 4.97% of participants identified as non-binary or third gender, and 1.66% of participants identified as other.

Figure 1. Participants' College Affiliation

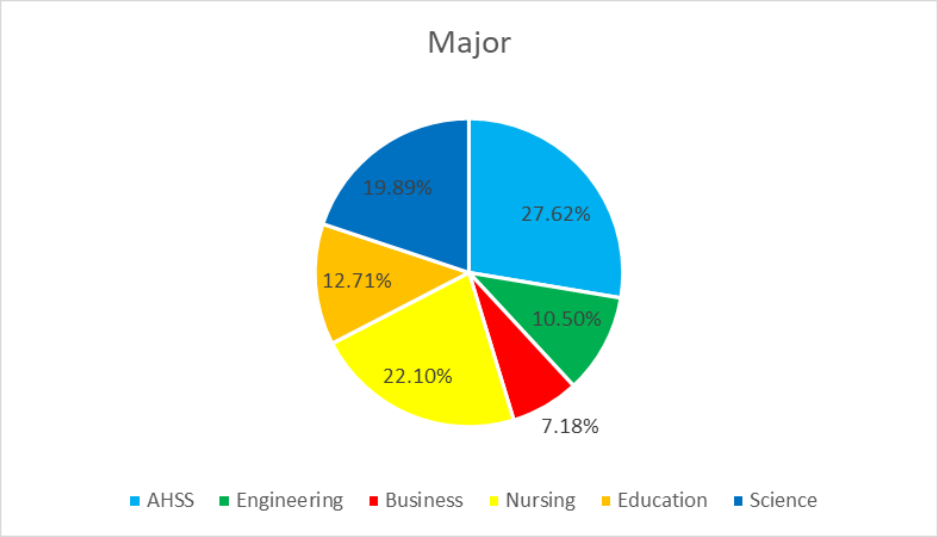
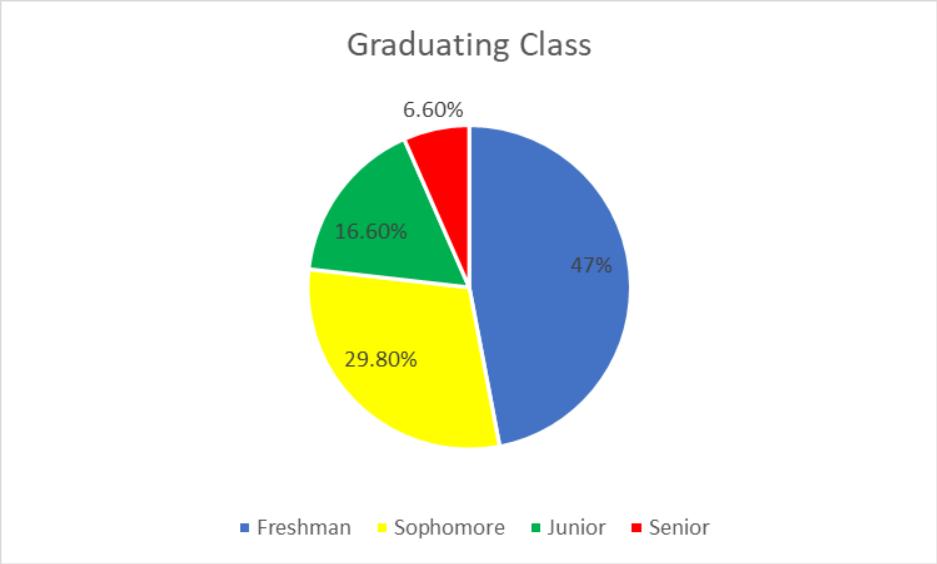


Figure 2. Participants' Class Level



Design and Materials

The design of this study was a survey study. The data were collected through the software, Qualtrics. Student participants were asked about their preparedness across different school subjects in the following domains: math, arts, humanities, sciences, social sciences, and life skills. Common school subjects were chosen after examining the different subjects offered in schools both in the United States and internationally. Further subtopics were then added to provide clarification for the common school topics (see Appendix A for a list of these topics).

For each school subject, participants were asked to indicate whether they 1) had adequate exposure to the topic prior to college/post-high school (Adequate Exposure), 2) currently use the topic in coursework/life post-high school (Use), 3) felt knowledgeable in the given topic prior to college/post-high school life (Knew), and 4) wish they knew more about the topic prior to college/post-high school life (Wish Knew). Participants answered questions for each topic in each of the four sections (Adequate Exposure, Use, Knew, and Wish Knew) using a 5-point Likert scale, with Strongly Agree (5), Somewhat Agree (4), Neither Agree or Disagree (3), Somewhat Disagree (2), and Strongly Disagree (1) as the response options.

Procedure

Participants signed up for the study via SONA, an experiment management software system. Participants were then provided a link to the Qualtrics-based survey. After providing electronic consent, participants were asked to work through the questions, rating whether they had adequate exposure, use the topic, knew the topic, or wish they knew more about the topic across the various domains (math, arts, humanities, sciences, social sciences, and life skills). After participants completed the survey, they were debriefed, asked whether they were okay with their data being included in our analyses, and then dismissed. The survey took approximately 45-60 minutes to complete.

Statistics

Repeated measures analyses of variance (ANOVA) were run in SPSS for each of the four questions – Adequate Exposure, Use, Knew, and Wish Knew – to determine whether participants' responses differed significantly across the various school subjects. The ratings for math, arts, humanities, sciences, social sciences, and life skills were compared overall, and as a function of the student's major (i.e., college). The estimated marginal means and standard errors for each question as a function of the various school subjects were calculated. Pairwise comparisons were then used to compare the means between school subjects for any significant outcomes, with significance set at $p < 0.05$.

Results

The first repeated measures ANOVA examined whether student ratings regarding whether they had adequate exposure to the various subject domains before beginning college differed by domain. This ANOVA revealed significant differences in the ratings across the various domains, $F(5, 170) = 78.684$, $p < .001$, $\eta_p^2 = .698$. As may be seen in Figure 3 (panel A), pairwise comparisons revealed that the Humanities mean was significantly higher than the other subjects, and the means for Arts and Life Skills were significantly lower than the other subjects ($p < .001$). No other comparisons were significant, $p > .05$.

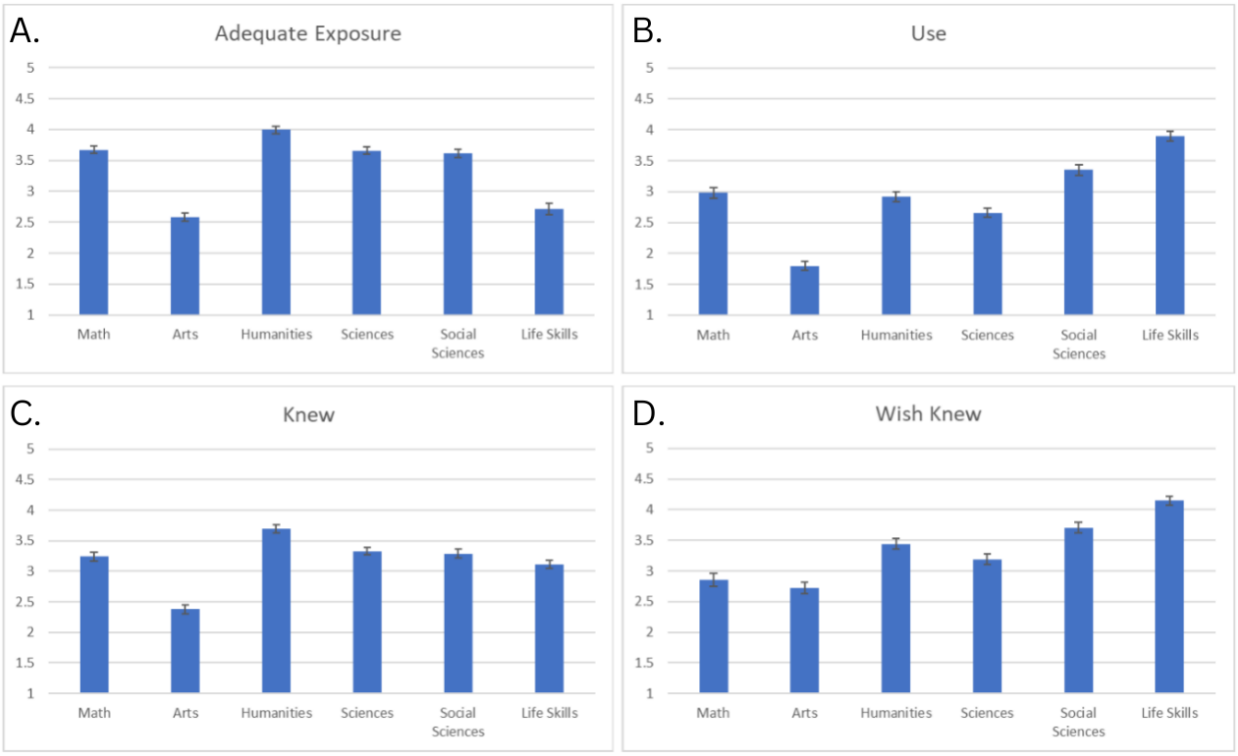
The second repeated measures ANOVA compared students' ratings of whether they currently use the various domains in their current education and whether ratings differed significantly by domain. For Use, there was a main effect of subject domain, $F(5, 170) = 116.922$, $p < .001$, $\eta_p^2 = .775$, indicating that ratings of use differed significantly across the different subject domains. As may be seen in Figure 3 (panel B), follow-up pairwise comparisons revealed significant differences between each of the subjects except for Math and Humanities ($p < .05$). There was also a significant Domain by Major interaction, $F(25, 870) = 4.831$, $p < .001$, $\eta_p^2 = .122$. The means and standard errors for Use as a function of subject domain and major may be viewed in Table 1.

Another ANOVA examined whether perceptions of knowledge differed across domains. For Knew ratings, there was a significant difference in the ratings across domains, $F(5, 170) = 56.205$, $p < .001$, $\eta_p^2 = .623$. As may be seen in Figure 3 (panel C), pairwise comparisons revealed that the Humanities rating was significantly higher than the other subjects, and Arts was significantly lower than the other subjects ($p < .001$).

Finally, a repeated measures ANOVA was run to compare students' ratings of what they wish they knew more about before beginning college. This ANOVA for Wish Knew also proved significantly different by subject domain, $F(5,170) = 39.609$, $p < .001$, $\eta_p^2 = .538$. As may be seen in Figure 3 (panel D), the pairwise comparisons indicated that there was a significant difference between participants' ratings for all subject domains ($p < .001$) except for Math and Arts ($p > .05$). In addition, participants' ratings for the various subject domains were found to differ by major, yielding a significant Domain by Major interaction, $F(25, 870) = 3.112$, $p < .001$, $\eta_p^2 = .082$. The means and standard errors for Wish Knew as a function of subject domain and major may be viewed in Table 2.

Figure 3

Bar graphs of the Four Questions as a Function of Subject



Bar graphs for questions asked. (A.) Bar graph of the means and standard errors for students having adequate exposure to each subject in high school. (B.) Bar graph of the means and standard errors for students using each subject in college and life post-high school. (C.) Bar graph of the means and standard errors for students feeling they knew each subject well after graduating high school. (D.) Bar graph of the means and standard deviations of students wishing they knew each subject more prior to college and life post-high school.

Table 1

Means and Standard Errors for Use as a Function of Subject Domain and Major

	Math	**Arts**	**Humanities**
AHSS	**2.437 (0.149)**	**1.913 (0.122)**	**3.149 (0.137)**
Engineering	**3.890 (0.248)**	**1.733 (0.204)**	**2.606 (0.228)**
Business	**2.734 (0.292)**	**1.573 (0.240)**	**2.454 (0.268)**
Nursing	**2.493 (0.166)**	**1.847 (0.137)**	**2.924 (0.153)**
Education	**2.770 (0.219)**	**1.888 (0.180)**	**3.337 (0.202)**
Science	**3.548 (0.175)**	**1.841 (0.144)**	**3.029 (0.161)**

Continued

	Sciences	**Social Sciences**	**Life Skills**
AHSS	**2.293 (0.127)**	**3.402 (0.144)**	**3.894 (0.129)**
Engineering	**2.900 (0.212)**	**2.946 (0.240)**	**3.786 (0.214)**
Business	**1.860 (0.250)**	**3.661 (0.282)**	**3.970 (0.252)**
Nursing	**2.797 (0.142)**	**3.387 (0.161)**	**4.031 (0.144)**
Education	**2.781 (0.188)**	**3.568 (0.212)**	**3.970 (0.190)**
Science	**3.316 (0.150)**	**3.143 (0.169)**	**3.737 (0.152)**

Table 2

Means and Standard Errors for Wish Knew as a Function of Subject Domain and Major

	Math	**Arts**	**Humanities**
AHSS	**2.642 (0.177)**	**3.023 (0.163)**	**3.401 (0.149)**
Engineering	**3.352 (0.295)**	**2.635 (0.271)**	**3.089 (0.249)**
Business	**2.049 (0.347)**	**1.587 (0.319)**	**3.273 (0.293)**
Nursing	**2.909 (0.198)**	**3.076 (0.182)**	**3.706 (0.167)**
Education	**2.957 (0.261)**	**3.024 (0.240)**	**3.687 (0.220)**
Science	**3.222 (0.208)**	**2.999 (0.192)**	**3.493 (0.176)**

Continued

	Sciences	**Social Sciences**	**Life Skills**
AHSS	**2.832 (0.148)**	**3.868 (0.153)**	**4.303 (0.132)**
Engineering	**3.468 (0.247)**	**3.373 (0.255)**	**3.944 (0.221)**
Business	**2.316 (0.292)**	**3.543 (0.300)**	**3.586 (0.260)**
Nursing	**3.493 (0.166)**	**3.865 (0.171)**	**4.452 (0.148)**
Education	**3.395 (0.219)**	**3.831 (0.226)**	**4.261 (0.195)**
Science	**3.635 (0.175)**	**3.766 (0.180)**	**4.325 (0.156)**

Discussion

As noted, the goal of the present study was to determine whether students believe their high school education prepared them well for college. After evaluating the results of the survey, the data showed significant differences in students' perceptions of adequate exposure to each subject domain (Adequate Exposure), as well as significant differences in students knowing each subject domain well (Knew). The data also showed a difference in students' use of each subject domain (Use) and wishing they knew more about each subject domain (Wish Knew), with ratings also differing by major. Hence, students use subject domains in different amounts, and wish they knew subject domains in different amounts, depending on their major.

In the domain of Math, the means differed significantly, with students in the College of Science and College of Engineering using Math more and wishing to know it more than students in the other colleges. For the Science domain, students in the College of Science gave higher ratings of use and rated their desire to know more about the subject higher than students in the other colleges. Students' ratings in the College of Business indicated they were less likely to use or want to know more about the Arts domain and Humanities domain than students in the other colleges. Social Sciences and Life Skills were both used fairly consistently across colleges, with the exception of those in the College of Engineering who said they were not using and not wanting to learn more about the Social Sciences.

The results of the present study and the previously reported graduation rates converge to suggest that our current education system in the United States is largely failing to prepare students for their intended field of study in college. Since the current system heavily revolves around students knowing math and ELA, it fails to allow students the freedom to learn about

what they are interested in and prepare for a career in their chosen field. Hence, the United States education system should be altered to implement a system similar to that of Sweden or Norway.

In this remodeled system, students would spend the first nine years of schooling in a broad range of subjects covering their general education, introducing new topics as the student reaches the proper developmental stage and level of readiness. Following this, students would have the opportunity to pursue specific coursework that would prepare them for a future college major that would continue to cover many of the same subject domains, with varying focus on subtopics of each domain. Critically, the curriculum would be based around preparing students in that particular subject field. For example, a student pursuing a degree in the sciences would continue to learn the humanities, but their reading- and writing-based classes would be more centered around the student reading and comprehending scientific texts and writing lab reports or scientific papers. Likewise, the student would likely focus more on science-based classes than history-based classes.

Given the significant differences observed in students' perceptions of adequate exposure and knowing each subject varying by subject domain, the current system is failing to fully introduce students to each academic subject and prepare them in that subject. The data show that students are being well introduced to the Humanities, largely due to the repetition of subjects like U.S. History and World History throughout elementary school, middle school, and high school. However, schools are failing to introduce students to the Arts and Life Skills. Our results support the idea of students being introduced broadly to all subject fields for the first nine years of their education, but this should be done in a more equal manner to properly introduce students to all subjects.

Given the significance of Wish Knew and Use as a function of both subject domain and major, it shows that students not only desire to learn more about the subjects that they are interested in majoring in, but they also use specific subjects more depending on their chosen major. Hence, the use of major-specific pre-college programs would fit students' desire to learn more about subjects they are interested in, likely promoting independent learning and filling the need of preparing students adequately for material used in college.

The data also suggests that Math, which in many states students are required to take three to four classes in during high school, is largely only used by students in the College of Science and College of Engineering. Hence, students wishing to pursue degrees in business, nursing, education, or AHSS, would benefit more from other courses rather than learning complex math that they will likely not use again. Likewise, Science is largely only used by students majoring in sciences. However, subjects such as the Social Sciences and Life Skills, which are often not required or even taught at some high schools, are heavily used by college students. Hence, these subjects should be more integrated into the curriculum in order to prepare students for college and life after high school. Humanities, which students reported as being adequately exposed to and knowing, was not used as much as other subjects, and this is likely due to the breadth of the material they are required to know in high school but do not use in college. Redefining the curriculum to include what students in a given field would need to know would thus be a more beneficial system. This could be done very effectively by remaking the last three grades of high school geared towards preparing students for a college major.

Since the participants of this study feel that the current education system fails to prepare them for post-secondary education or life after secondary education, a new educational system

may be considered to help students feel more prepared. The Swedish and Norwegian educational systems provide a reasonable solution to this problem.

Since Swedish students in secondary school are asked to develop an educational plan with their instructors to be utilized throughout their secondary education, students have the opportunity to engage in self-directed learning that fosters them into confident adults ("About Swedish Schools and Education," 2022). Additionally, students are encouraged to learn more about topics that interest them and can help them make connections in the world they live in. Similarly, for students in secondary school in Norway, students have the option of either attending secondary education for general studies or a vocation ("General Information About Education in Norway," 2023). With this system, students are given the independence and freedom to decide what they would like to do in the future. If students decide to pursue higher education after they have chosen the vocational track, the students have the opportunity to take supplemental classes that would make them eligible to attend a post-secondary institution.

The Swedish and Norwegian school systems concur with ideas from both the Montessori Method and the concept of self-efficacy. In the Montessori Method, students are introduced to a broad range of topics that they may choose to learn more about, and students are given the freedom to choose topics to focus and work on (Mendoza et al., 2021). Additionally, students have the opportunity to work alone or with others to promote collaborative learning in different stations. Students have the freedom to move from station to station to best suit their needs during the school day. Additionally, students learn to become self-directed and develop a curiosity about the world around them. Thus, by utilizing the Montessori Method, students are given the independence and freedom to learn about topics that are most beneficial to them.

Although the Montessori Method is typically utilized in lower level education, the Swedish and Norwegian secondary school designs agree with ideas of the Montessori Method. In the Swedish educational system, students are encouraged to seek knowledge starting in primary school, and they are exposed to a broad range of school subjects. Additionally, every student in Sweden and Norway is given the opportunity to succeed with resources provided to them based on their needs. Students are encouraged to ask questions and be curious about the world in which they live.

Since both the Swedish and Norwegian education systems allow students to have more freedom in their educational pursuits, a strong sense of self-efficacy is fostered in the students. Instructors and students are both involved in making educational decisions together, and thus, the students are engaged in the learning process (Webb-Williams, 2017). Therefore, students learn how to set reasonable goals that they will be motivated to achieve. High school students in Sweden are required to collaborate with their instructors to create a plan that would be used for the rest of their secondary education. The students meet regularly with their instructors to ensure that they are achieving their goals and are receiving the proper support to do so. Through the process of creating the secondary education plan, students come to realize what is an achievable goal for them, and they become motivated to achieve their goals since they are involved in the process of making the goals. Students in both Sweden and Norway have different options for post-secondary education or career paths. Students with strong self-efficacy will know which path is achievable for them while being self-motivated to complete the program that they have chosen.

Since the current study only focused on student experiences with college preparedness, further research may be necessary to determine how college instructors view the college

preparedness of their students. A further study may be beneficial to determine if there are any discrepancies between the views of students and instructors regarding college preparedness and what is taught in college. A future study may survey college instructors at the same college to determine their views on what they think their students learn and how prepared they believe their students to be for college.

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Appendix A: Survey Questions

Demographics

The following Questions were asked regarding the participant's demographics:

1. What is your current class standing?
2. What is your major(s)? (List all)
3. What is your minor(s)? (List all)
4. What is your birth date?
5. What is your gender?
6. What is your ethnicity?
7. What is your current living situation?
8. What was your high school setting?
9. What was the size of your high school graduation class?
10. Highest Degree of Education Completed by Parent/Guardian 1
11. Parent/Guardian 1 Occupation
12. High Degree of Education Completed by Parent/Guardian 2
13. Parent/Guardian 2 Occupation
14. Parental Marital Status during High School
15. Household Income of Parents When You Were in High School
16. Did you attend high school in the United States? If not, please indicate which country you attended high school.

Survey Questions

The following questions were asked in the survey rated using the Likert Scale (Strongly Disagree-Strongly Agree):

1. I had adequate exposure to the below topic prior to college/post-high school.
2. I use the below topic in my coursework/life post-high school.
3. I feel that I knew the below topic adequately well prior to college/post-high school life.
4. I wish I knew more about the below topic prior to college/post-high school life.

Survey Categories

The questions in Survey Questions were asked regarding the following topics in each category listed:

Math

Algebra	Trigonometry
Algebraic Variable Expressions (ex. y=5x+7)	Trigonometric Ratios
Writing Expressions for Variable Relationships in Problems	Inverse Trigonometric Ratios
Equations and Inequalities	Laws of Sine and Cosine
Real Numbers ex. Rational (2/3, 1) and Irrational Numbers (pi, e)	Unit circle and Respective Triangles
Non-real Numbers (ex. i)	Trigonometric Identities
Polynomial Operations (ex. FOILing, Factoring, Rationalizing)	Graphs of Trigonometric Functions
Logic in Equations	Linear and Angular Velocity
Systems of Equations	Basic Trigonometric Proofs
Graphical Analysis of Systems of Equations	Trigonometric Systems of Equations
Logarithms and Functions of e	Trigonometric Equations
Properties of Logarithms and Functions of e	

Calculus	**Statistics**	**Geometry**
Limits	Frequency Tables	Types of Transformations (ex. Reflections, Rotations, etc.)
Continuity	Histograms	Constructing Lines and Angles
Vectors	Mean, Median, and Mode	Basic Proofs
Asymptotes and Limits at Infinity	Interquartile Range	Types of Angles and Triangles
Product and Quotient Rules	Box and Whisker Plots	Congruency

Exponential Growth and Decay	Standard Deviation	Reflexive (If a is a number, then a=a), Symmetric (If a=b, then b=a), and Transitive (If a=b and b=c, then a=c) Properties
Chain Rule	Comparing Distributions	Symmetry Around an Axis
Implicit Differentiation	Percentiles	Pythagorean Theorem
Differentiation of Trigonometric Equations	Z-Scores	Area of Triangles, Circles, and Polygons
Higher Order Derivatives	Normal Distribution	Distance and Midpoint
Finding Area under a Curve	Trendlines	Parallel, Perpendicular, and Orthogonal Lines
Related Rates	Planning a Study	Triangle Ratios
L'Hospital's Rule	Sampling Methods	Circumference and Perimeter
Riemann Sums	Experimental Design	Degrees and Radians
Definite Integrals	Conditional Probability	Volume
Indefinite Integrals	Permutations + Combinations	2D vs. 3D Objects
Sketching Slope Fields	Probability Distributions	
Graphs of Derivatives		

Arts

Art	Music	Theater
Visual Elements (ex. Space, Texture, Light, and Color)	Major Works of the 17th and 18th Centuries	Acting Skills
Dry and Liquid Media	Notes vs Rests	Perform Monologues
Graphic Design Basics	Major Scales	Perform Short Scenes
Animation Basics	Major Keys	Performance Styles
3D Art ex. Clay, Wood, Metal	Variations of Major Scales	Improvisation
Prehistoric Art in Europe	Beat Division and Meter Type	Script and Character Analysis

Art of the Ancient Near East	Tempo	Production Process
Art of Ancient Greece	Dynamics	Shakespearean History
Jewish, early Christian, and Byzantine Art	Texture	Analysis of Famous Works (ex. Romeo and Juliet)
Islamic Art	Melodic vs Harmonic Feature	
Art of South and Southeast Asia	4-Part Voice Leading (Soprano, Alto, Tenor, Bass)	
Chinese and Korean Art	Pitch Notation	
Japanese Art	Rhythmic Devices	
Art of the Americas	Motives	
Art of Ancient Egypt	Sections of Musical Works	

Humanities

English	Philosophy	Foreign Languages
Professional Writings (ex. Resumes, Cover Letters)	Ethics	Grammar Mechanics of a Foreign Language
Creative Writing	Principles of Thought	Vocabulary of a Foreign Language
Writing Lab Reports	Religion	Sentence Structure of a Foreign Language
Grammar Conventions	Free Will and Determinism	Foreign Culture
Writing Research Papers	Epistemology	
Vocabulary	Worldviews	
Essay Writing		

World History	U.S. History	Literature
Classical India and Asia (Empires and Dynasties)	Pre-Colonial Period	Reading and Understanding Scientific Texts

Civilizations in the Americas (Aztecs, Inca, Maya, etc.)	Colonization	Reading and Understanding Historical Texts
Paleolithic and Neolithic Eras (First Humans)	Revolutionary War	Reading and Understanding Technical Texts
Western River Valley Civilizations (Ancient Egypt and Mesopotamia)	Founding of the U.S. Governmental System	Reading and Understanding Informational Texts
Eastern River Valley Civilizations (Ancient China and the Indus Valley)	War of 1812	Reading and Understanding Social Texts
Civilizations in Africa (Ghana, Songhai, Mali, etc.)	Manifest Destiny	Reading and Understanding Fictional Texts
Ancient Greece	Slavery in American Culture	Literary Devices (ex. Symbolism, Hyperbole)
Ancient Rome	Civil War	
Byzantine Empire	Reconstruction	
Islamic Civilizations	Industrialization	
The Middle Ages	Imperialism	
Location of Countries	World War I	
Major World Cities	Roaring 20’s	
The Renaissance	The Great Depression	
The Reformation	World War II	
The Romantic Period	Cold War	
Age of Discovery	Civil Rights	
The Enlightenment	Modern America	
The French Revolution		
The Industrial Revolution		
World War I		
World War II		

The Cold War		
The Modern World		

Sciences

Chemistry	Atmospheric and Earth	Physics
States of Matter	Solar System and Planets	Force
Solutions	Phases of the Moon	Mass
Periodicity	Seasons	Acceleration
Intermolecular Forces	Climate Change	Momentum
Electromagnetic Radiation Spectrum	Rock Cycle and Plate Tectonics	Newton's Laws
Chemical Changes	Water Cycle	Coulomb's Laws
Physical Changes	Weather Prediction	Electric Fields
Kinetics	Tornadoes	Magnetic Fields
Equilibrium	Hurricanes	Waves
Atomic Structure	Tsunamis	Electromagnetic Radiation
Bonding Orbitals	Earthquakes	Forms of Energy
Electrochemistry	Thunderstorms	Energy in Systems
Thermodynamics	Blizzard	Calculating Energy
Thermochemistry	Flood	
Stoichiometry		

Computer Science	Environmental	Biology
Data and Data Science	Biosphere	Cellular Structure and Function
Block-Based Programming	Land	Evolution and Natural Selection
Text-Based Programming	Forests	Heredity and Genetics

Physical Computing	Soil	Anatomy and Physiology
Maker Activities	Water	Botany
Cybersecurity	Sources	Microbiology
Internet Hardware	Resources	Zoology
Internet Software	Environmental Policies	

Social Sciences

Economics	Psychology and Sociology	Political Science
Economic Systems	Sensation and Perception	Forms of Government
Supply and Demand	Consciousness	U.S. Constitution
Determining Market Prices	Theories of Development	Bill of Rights
Profit	Personality	U.S. Government Branches
Inflation vs Stagflation	Emotion	Political Parties
Market Structures and Competition	Learning (ex. Conditioning, Social Learning)	Basics of Political Participation
Business Cycle	Motivation	Foreign Policy
Economic Growth	Abnormal Psychology	Governmental Types
Fiscal Policy (Spending and Taxing)	Stereotypes, Prejudice, and Discrimination	
Banking	Group Behavior	
Economic Policy	Social Influences	
International Trade		
Trade Barriers		
Trade Agreements		
Principles of Investment		

Life Skills

Taxes	Changing a Tire	Checking Oil
Changing Oil	Cooking	Laundry
Basic Sewing	How to Use an Iron	Nail/Hammer and Screwdriver
Balancing a Checkbook	Contract Basics	Debt Awareness/Personal Finance
Renters Basics		