College in the Schools: Presenting a college course on creativity in high school
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Abstract

Creativity is an inherent trait in humans, but measured creativity peaks in fourth grade. It is an essential skill often ignored in traditional education. Through “concurrent enrollment”, a university credit course designed to develop learner creativity was offered to high school students. They were compared to students from the parallel university course using the Torrance Tests of Creative Thinking, and they were scored comparably if not higher in most metrics. Observations from the process and experience will be presented.

Keywords: creativity, dual-enrollment, concurrent enrollment, high school

Introduction

In the United States, in most states, students have a wide range of options to earn college credit while still enrolled in high school. High school students can earn college credit through Advanced Placement or International Baccalaureate programs; both offer more rigorous courses as part of the regular high school curriculum (Center for School Change, 2015). Students also can enroll in on-campus classes at colleges and universities. And in most states, American high schools can participate in what are called “concurrent enrollment” programs (Flynn, 2019).

Concurrent or “dual” enrollment refers to university courses presented in high schools for college credit, where students are enrolled in both high school and college. The courses are taught by qualified teachers in the high school, follow college syllabi, and are monitored by university faculty. They are meant to be equivalent to the same class offered on campus. The program at the University of Minnesota is called College in the Schools (CIS). Other higher education institutions in the state also offer concurrent education offerings, including private colleges and other state educational systems.

The program offers courses at over 100 high schools in Minnesota and Wisconsin. Courses are offered in basic sciences, foreign languages, math, statistics, and English (University of Minnesota, 2021). In 2021, for the first time, College in the Schools offered a course in the design field called Creative Problem Solving.

The course has been taught as a regular course at the University of Minnesota for over 20 years. Located in the College of Design, it has the singular goal of developing creativity in learners. It differs from most courses as it is not about the teaching of facts or information, but is rather about the development of a cognitive skill: creativity (What Works Clearinghouse, 2017). The course is required for Retail Merchandising majors and also attracts a large number of students from other majors including architecture, graphic design, communications, agriculture, and business.
The course work centers on a series of challenges or “Do Something Differents” which occur weekly for the first 12 weeks of the course. The goal is to develop in learners a habit of trying new things, seeking more answers, and being creative in all efforts. In class exercises, discussion, and lectures round out the course.

Traditional informational “content” is also included in the course with readings and quizzes to examine basic elements of creativity. This includes an understanding of the two basic forms of thinking, divergent and convergent thinking. Convergent thinking is the single-answer, direct form used in most education, whereas divergent thinking continually seeks new and different answers.

Application

The creativity course was taught for the first time at a high school in fall semester 2021. A section of the course was presented by an instructor based at Anoka high school and who was the director of the maker space. He had extensive experience in managing and running the makerspace and in teaching science and supporting classes.

The course coordinator (and university instructor) visited the high school on multiple occasions to observe the class in process. This was required as part of the College in the Schools program. Two additional visits were used to apply the Torrance Test to the class, to monitor the class, and one additional time to explain the standardized results. Visits were also required by the university to assess teacher performance in the course.

The high school course and its concurrent offering in the university were compared using the Torrance Tests of Creative Thinking (TTCT). It is a widely used evaluation of creativity. Results and the structure of the test were presented to students in both courses as part of the regular content.

Both groups of students completed the first (or “A”) version of the TTCT in the first week of the term. University students took the second “B” version the test in the 11th week of the semester; the high school students in the class completed the B version in the 12th week. The different versions are used for pre- and post- treatment but are comparable in content and execution. The tests were sent to the publisher, STS Testing, for scoring for both the on-campus students and the high school students.

Test results were distributed to all students for both versions of the test, increasing their understanding of how creativity is evaluated. University students received results prior to the end of the semester; but as the high school term had ended, those students received their results prior to the start of their second term.

Both the A and B versions of the test have six questions that require verbal, written responses. Three of the questions on both tests focus on a single image; the other three questions require answers regarding hypothetical situations or as an alternative uses test.
Each question in tests was scored yielding a combined raw score for three metrics; Fluency, Flexibility, and Originality.

Half of the students in the high school class were juniors, half seniors. The Torrance Tests rate scores based on grade level only through the 12th grade. High school students were rated by the scoring agency as 11th or 12th grade; all college students were scored as adults. All university students are scored as grade 13 or adult.

As raw scores are not manipulated by previous calculation, they provide the clearest sense of the performance of the participants. Comparison by raw scores for Fluency, Flexibility, and Originality provides a direct comparison between the university students and the high school students.

Grade-based results showed impressive gains for the high school students. As high school students, their scores were compared with students of comparable age and grade available in the test publisher’s data base. Anoka students increased their average standardized score from the 63rd percentile to the 94th percentile for their age group. Their scores went from 107.04 to 136.15.

On-campus results were comparable to previous iterations of the course. University based students increased their standardized score from the 56th percentile to the 71st percentile for the open/adult grade level (which results in less substantial gains in comparison). Their average standardized score went from 108.24 to 114.08.

Results were also compared with 2013 testing of a similar population in the same school district, the average standardized score for 11th grade students was 99.87 (Hokanson and Bart, 2014). Comparable testing methods for that research were used but the Figurative Torrance Test was the research instrument. Higher initial scores could be attributed to the expression of interest in creativity among students choosing the course, implying possible higher initial skill levels.

Three other metrics were also examined for both groups, fluency, flexibility, and originality.

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<th></th>
<th>high school [N=30]</th>
<th>university [N=43]</th>
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<tbody>
<tr>
<td></td>
<td>Pre-</td>
<td>post-</td>
</tr>
<tr>
<td>Fluency</td>
<td>98.3</td>
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<tr>
<td>Originality</td>
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<td>Flexibility</td>
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Table 1: Average raw scores, pre/post

For the high school students, average raw score for the first metric, Fluency (the measurement of the ability to generate new ideas), increased 41 percent. Originality, the measure of the uniqueness of ideas in the general population increased 53 percent. Flexibility, the development of new and unusual ideas increased 18 percent. Gains were similar for university students, the average raw scores increased 42.99% for Fluency, 55.00% for Originality, and
24.11% for Flexibility. For the on-campus students, Fluency increased 58.3%; Originality increased 73.6%, and Flexibility increased 31.1%.

**Comments of class participants**

High school students were receptive to the course as evidenced in their comments:

*How would you describe this class to a friend or peer who was considering taking it next year?*

“A class where you are able to mentally push yourself and watch your performance.”

“I would definitely take it because you really learn how to truly expand your creativity and learn about yourself.”

*How was this class different from other classes you have taken?*

“It was my first class that was mentally challenging.”

“It was different in a sense…the material is improving on what you already know. It was expanding your creativity and it really got students out of their comfort level.”

*What would you say is the #1 tip for success in this class?*

“Don’t be afraid to put yourself out there and don’t hold back. No one judges and honestly, the more crazy, the more creative it is.”

*Why do you think your average, age-based score changed the way it did from the pre to post-test? What was different for you when you took the pre versus the post-test?*

“Because I was able to practice throughout the class on the level of my answers and amounts and because of my level of participation.”

“The post test felt more natural and I felt like I could think of much more much much faster.”

“I think my average score changed because I wasn’t worried about having a good idea like before. The post-test I was able to write down more ideas and have more original ideas.”

*Closing thoughts... what do you do with the experience provided by taking this Creative Problem Solving class? What do you carry with you into the future? How does this live on, beyond being a class with a grade?*

“I'm able to think past my first idea. I find myself thinking differently than how I did before. I try to think more into the adjacent possible.”

“I learned throughout this class to not only be more creative but more outgoing. This class really pushed me out of my original comfort level and to do things just for the grade. I also learned how to apply creativity into my daily life.”

“I want to be a more fluent conductor in communicating ideas by the time I enter the work force. I'll carry with me the weird and fun experiences that occurred during my time in the class. The
concept of "Do the most good" will stick with me well beyond my time in school, as will the work ethic and vision of [the teacher].”
“The ability to go into challenges and jobs more confident and in more creative ways.”

Summary

The class demonstrated a college level course could be successfully presented to selected high school students, providing an opportunity for them to earn college credit while still in high school. While they participated in a “pilot” offering of the class, they found the class to be worthwhile as a learning experience. Their performance was better or at least comparable to a parallel course offered on campus by the sponsoring university. The high school students were competitive with the on-campus university students in their test-based performance in the class, even scoring higher in raw- and age adjusted results. While the high school students scored higher in the initial testing, they recorded gains in terms of raw scores that were less substantial.

Sources:

Center for School Change (2015). Dual Credit Comparison Chart.


