AC 2007-1892: A NOVEL PROGRAM OF PARALLEL PRE-ENGINEERING AND VISUAL AND PERFORMING ARTS EDUCATION AT THE HIGH SCHOOL LEVEL

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A Novel Program of Parallel Pre-Engineering and Visual & Performing Arts Education at the High School Level

Abstract

A pre-engineering program that incorporates parallel participation in the visual & performing arts has been designed at a regional high school. This program would interact with a college-level program that also features engineering/visual & performing arts integration. The rationale for the program is presented that includes the results of a survey that probed both student and parent interest in such a program. Survey results indicated a strong interest in such a program. Also, details of the program and how the high school/college interactions occur will be presented. In addition to providing a broader educational experience including positive benefits to the engineering component, such a program should also have a positive impact on both retention and recruitment of engineering students.

Introduction

Engineering education has traditionally focused on the development of a variety of math, science, analytical, and related skills necessary for the engineering professional to succeed in his or her chosen profession. Recognizing the value and need for skills and knowledge beyond engineering, ABET and other engineering professional societies (including the American Society for Engineering Education) have also stressed the value of the liberal arts (see note 2) part of undergraduate engineering education. Kranzberg=s 1993 article[1] presents a good overview of this subject as it relates to engineering. Dr. Shirley Jackson=s 2001 speech[2] is another good summary along with a document produced by the Liberal Education Division of ASEE[3]. The Royal Academy of Engineering in Great Britain has also addressed the issue of involving the arts in engineering[4].

Various innovative approaches have been proposed and implemented to allow the engineering student more exploration in the liberal arts (for example, see the summary by Florman[5]). Examples of undergraduate academic programs which allow the engineering major to simultaneously pursue interests in the liberal arts include the University of Wisconsin-Madison AEngineering Honors in Liberal Arts@ program, the joint liberal arts/engineering programs at the University of Michigan and University of Iowa, and the engineering science/liberal arts programs at Smith College and Dartmouth. All of these approaches have focused on the Atraditional@ academic liberal arts (literature, art, and music history, critical analysis, and appreciation) rather than the visual & performing arts (VPA) (see note 3) . The dual major program at Lehigh University allows simultaneous pursuit of bachelors degrees in engineering and the liberal arts, including possibilities in the performing arts (students can select from a wide list of liberal arts programs). The University of South Florida has recently implemented an undergraduate certificate program (ACertificate in the Arts@) designed specifically for engineering majors. This allows students to pursue the traditional engineering curriculum while simultaneously pursuing an interest in one of the VPA.

In general, it has been our position that students with definite talents in both engineering and the VPA would benefit from an environment that is supportive of the development of both areas. We have focused on theVPA specifically rather than the broader liberal arts since the VPA incorporates both Aacademic@ humanities (literature, art history, music appreciation, cultural analysis, etc.) and Aparticipatory@ or Aperformance@ humanities (dance, music performance, art, theater, etc.). One has to actually Ado@ something in order to participate in the VPA. Also, the VPA typically require more person-to-person and group interactions. Finally, the VPA often require Areal time@ problem analysis and solution in situations where many solutions may be possible. Thus the VPA have an interesting potential to complement the analytical nature of engineering and enhance the involved individual, providing an educated person with broad technical skills, cultural and personal skills, and additional talents which should lead to a high quality life experience.

The role of K-12 education in preparing students for an engineering education has been a very important topic. Many projects have investigated the role of science and math classes in establishing the foundations for an eventual engineering career, typically concluding that Ayou can=t start soon enough@. Paralleling such interests, one of the motivations of the program reported below is to extend the engineering/arts environment developments occurring at the college level to the secondary level, specifically grades 9-12. Such a program is being developed at Riverview High School in Sarasota, Florida, and will be described below. As part of the development of such a program, a survey of high school students and parents was conducted to explore the attractiveness and perceived value of such a program. The results of this survey will show that there is indeed interest and support for such a development.

A survey of student/parent attitudes

A survey instrument was designed to explore: 1) the extent to which high school students currently were involved in the VPA; 2) parental/student attitudes towards the extent to which VPA pursuit should be incorporated into the general engineering curriculum; and 3) the influence of environmental factors such as high school program, parental background, and first time in college (FTIC) status.

Survey Methodology

Current high school students and parents of high school students were surveyed separately. The inclusion criteria for survey participation were: 1) student (or parent=s son/daughter) was currently at the junior or senior level (determination assisted by the teachers/schools); and 2) the student (or parent=s son/daughter) intended to pursue some engineering discipline at the college level (determined via self-report). Students and parents from three types of high school environments were pursued: 1) International Baccalaureate (IB) programs; 2) Technology/Engineering (TE) magnet programs; and 3) general high school (HS) programs. Per the Institutional Review Board (IRB) policies, all participants were anonymous and school identities/affiliations known only to the investigators. Furthermore, no attempt was made to link up parents and their son/daughter.

A total of three IB programs, two TE magnet programs, and three general HS programs participated from the central Florida region, with the study completed during the spring of 2006. General information on the participants is summarized in Table 1. For purposes of the study, any items addressing a parent=s status or opinion required that at the response was true of at least one parent. In terms of classifying parental academic achievement, Acollege graduate@ indicated that at least one parent had graduated from college with a bachelor=s degree or higher, Aprofessional@ indicated that at least one parent had earned an M.D. or Ph.D. degree, was an attorney, or was involved in a profession that required both a college degree and licensure (e.g., Certified Public Accountant, Professional Engineer, etc.). Also, the Visual and Performing Arts (VPA) were defined as the visual arts (painting, drawing, photography, printmaking, etc.), music (instrumental or vocal), dance, and theater. VPA talent determination was via self-report, with no classification as to the extent of talent development or achievement.

Survey questions were of two general types: 1) simple questions providing background/classification information such as high school program affiliation (IB, TE magnet, or general HS), if any VPA talents were claimed (if so, in what areas), parent academic achievement status, and whether the student would be a FTIC student in terms of the immediate family history; and 2) questions that specifically probed attitudes towards the VPA and their role in both the high school and college environment, given that the student was primarily an engineering student. Most of the latter questions employed a 5-point Likert scale (AStrongly agree@, AAgree@, ANeutral@, ADisagree@, and AStrongly disagree@) to evaluate specific statements.

In addition, post-survey focus groups were conducted at each school site (for students and parents separately) using 3 to 5 randomly selected survey participants. Focus groups typically lasted 10-15 minutes and were facilitated by the study investigators. The focus groups were designed to solicit general feedback on the completed surveys and additional qualitative information regarding the study objectives.

Survey results

As noted in Table 1, 230 students and 129 parents participated in the survey. Of the 230 students in the student survey (SS), 81 (35.2%) claimed a VPA talent; of the 129 parents in the parent survey (PA), 48 (37.2%) claimed to have a student with a VPA talent. Of the students with a VPA talent, the area of talent was as follows:

	Student survey	Parent survey
Visual arts	30 (37.0%)	17 (35.4%)
Photographic arts	11 (4.8%)	8 (3.5%)
Ceramics/related	4 (1.7%)	1 (0.4%)
Theater	16 (7.0%)`	8 (3.5%)
Music - instrument	47 (20.4%)	31 (13.5%)
Music - voice	21 (9.1%)	7 (3.0%)
Dance	8 (3.5%)	5 (2.2%)

Musical talent was clearly the most popular, followed by the visual arts. The remaining talents

were less popular, but still had student interest.

Table 2 indicates that most students pursued VPA activities as part of their school activities (over 50% for both groups). When combined with the Aboth at school and away from school@ group, the number rises to over 70% for both groups. Thus many of the students are already experiencing some integration of school and the VPA.

It is interesting to note (see Table 2) that the IB students displayed the highest concentration of VPA talent (43.2% of IB students in the SS; 56.3% in the PS). The TE magnet students had lower concentrations of VPA students (39.5% of TE-magnet students in the SS; 25.0% in the PS). The general HS students had the lowest (17.3% of the general HS students in the SS; 18.8% in the PS). Concentrations among FTIC students were low (11.1% of FTIC students in the SS; 20.8% in the PS).

As the information in Table 3 indicates, parents are generally supportive of their son=s/daughter=s participation in the VPA. Specifically, 77.1% (SA+A) were supportive of their VPA-talented students. Strong support was shown for both the IB students and TE-magnet students (SA+A greater than 85% in both cases). Support was comparatively lower for the FTIC student parents: 50.0% SA+A. While not included in Table 3, similar trends were seen in the SS data. For example, of the 81 VPA students, 84.0% either strongly agreed (SA) or agreed (A) that their parents were supportive.

Furthermore (Table 3), most parents of VPA-talented students felt that their son=s/daughter=s involvement in the VPA was a good thing (79.2% SA+A in the PS). The IB students had the highest values (81.5% SA+A in the PS). The FTIC students reported the lowest values (30.0% SA+A in the PS). In the PS, Professional parents were 81.3% SA+A and parents who themselves claimed a VPA talent were 84.8% SA+A. While not shown, SS data trends were very similar. Focus group information indicated that the FTIC student parents felt that VPA interests were somewhat distracting from their son=s/daughter=s primary studies. Conversely, IB parents typically felt rather strongly that VPA participation was valuable.

However, when parents were asked if VPA participation would be useful in the student=s future careers as (presumably) engineers, only 25.0% SA+A felt there would be some positive future impact (curiously, students themselves were more optimistic at 46.9% SA+A). FTIC parents were very skeptical, reporting only 20.0% SA+A, with 40% disagreeing and 20% strongly disagreeing. Even Professional parents and VPA-talented parents were skeptical in the PS, with 31.3% SA+A and 30.3% SA+A reports respectively. In focus groups, parents often could not specifically elucidate the positive benefits of VPA to their son=s/daughter=s future engineering professions, although many reported positive secondary effects such as stress management, creative involvement in something other than work, more well-rounded individuals, more positive self images, etc. Curiously, students in the SS (data not tabulated) felt more strongly than their parents that VPA participation would play a positive role, with almost 50% SA+A.

Finally, Table 3 presents the results of parental views regarding if their VPA-talented students be encouraged to continue their VPA pursuits while actually in college. Overall, 72.9% SA+A

would be encouraging. However, only 10.0% SA+A of the FTIC parents would be encouraging.

Table 4 addresses issues around an educational environment that actively encourages student VPA development. Regarding high school active VPA participation encouragement, 79.0% SA+A of all parents of VPA-talented students indicated they would value such an environment (25.9% indicated strong agreement). However, only 33.3% SA+A of FTIC parents expressed support. Focus group discussions indicated (as before) the general FTIC parental concern of VPA activities distracting their engineering-focused students. However, enthusiasm was again heard regarding the non-FTIC parents. Student responses in the SS were similarly supportive for all non-FTIC students; FTIC students echoed their parental views.

Regarding college active VPA participation, the level of support was slightly lower; 66.4% SA+A of all parents of VPA-talented students indicated support. Support from FTIC parents was also lower (22.2% SA+A). However, support levels of Professional parents and parents themselves VPA-talented were higher (75.0% SA+A and 72.7% SA+A respectively). Similar results were observed in the SS. Focus groups generally indicated support, although not at quite the level of the high school environment question. Many reported unfamiliarity with such a concept and were not sure how it would work, although this unfamiliarity was not necessarily a negative. Many college graduate parents recalled their personal VPA exposure in college was minimal; many of these opined this was not necessarily a good thing.

The survey results clearly indicate that there would be support from both parents and students for an environment that actively encouraged VPA participation as part of engineering (or pre-engineering) education. This would be valid at both the high school and college levels.

A high school program that incorporates both the arts and pre-engineering

Recognizing the potential value of establishing an environment that incorporated both the VPA and pre-engineering, the faculty of Riverview High School (RHS), in collaboration with the University of South Florida (USF) have developed a program that seeks to accomplish this goal. RHS has many attractive features that are supportive of such an effort. RHS is a four year (9-12) comprehensive high school that includes an International Baccalaureate (IB) program. Also, students in grades 10-12 are organized into small learning communities (SLC) that includes a pre-engineering SLC known as the Edison I.D.E.A.=s (Innovations in Design, Engineering, and Aeronautics) @ and the ACreative Arts SLC@ that offers the performing arts (theater and music) and visual arts (including traditional and digital art and design).

Starting in 2007, RHS will offer students the possibility of pursuing a designated major while simultaneously pursuing a Across-disciplinary proficiency.@ The program incorporating engineering and the arts will be the AVisual Arts and Engineering SLC@ where students satisfy the four courses specific to pre-engineering in addition to four courses from the creative arts area. Details of the program are presented in Table 5. In addition to the RHS program that involves courses in both pre-engineering and the creative arts, other features include:

S The creation of a student society AEngineering and the Arts= that will interact

with the USF student organization of the same name. As appropriate, the RHS students can participate in USF-based activities such as attendance at arts events, lectures, exploration of arts facilities, etc.

- USF engineering/arts students and faculty from either engineering or the VPA will mentor RHS engineering/arts students, offering general career guidance along with support and encouragement.

We will also begin to develop a protocol where interested and qualified students from RHS can continue their engineering education (along with continued VPA activities) at USF. For highly qualified students, this could also involve the University Honors College.

As noted above, this program will formally begin at RHS in 2007. We intend to monitor student progress during their tenure at RHS and will administer a variety of survey instruments to quantify their experiences and academic performance, comparing their performance to two control groups: general pre-engineering students not also in the creative arts option and general non-engineering non-arts students. Examples of survey instruments include:

- *Stanford-Binet Intelligence Test* (SBIT) This established test measures nonlanguage reasoning skills and cognitive development, focusing on verbal reasoning, abstract/visual reasoning, quantitative reasoning, and short-term memory[6] .

- *Torrance Test of Creative Thinking* (TTCT). The TTCT is a well-established research measure of general creative ability[7,8]. The TTCT provides measures of individual differences in creative thinking and their relationship to other mental characteristics along with divergent versus convergent thinking abilities.

- *College Student Inventory* (CSI). This provides quantitative information on motivational assessment (including academic and social motivation) and general coping[9] .

- General background information would also be collected, including parental educational level, family background, ethnicity, etc.

Such data would be collected for several years before any trends or conclusions could be determined.

One benefit we hope to accomplish via the high school program is the enhancement of the perception of engineering as a possible academic major. For example, prospective K-12 students who might select engineering careers but are hesitant due to their perceived image of engineering as Adry@ and Alimiting@ might be more likely to select engineering knowing that there are more personal possibilities than just Aapplied math@. Also, we would hope to provide an academic pathway for students who really have talents in both engineering and the VPA that goes back to high school, defeating the idea that students must make a choice to pursue one or the other, but

not both.

Obviously this program should serve as a model for other school systems to consider adopting. To our knowledge, no other such programs are currently offered. Longer term, creative individuals that come out of such programs should provide inspiration and become role models for many of the next generation. As cited by one study[10], only 3% of the public associate the field of engineering with creativity. Indeed, many see engineers to be rather dull Aone-dimensional@ individuals. This perceived image (whether accurate or otherwise) may be causing some students with appropriate backgrounds to select fields other than engineering. In his recent book *A Whole New Mind* [11], the author argues that while engineers of the recent past have sought to be more Acompetitive@ by pursuing MBA degrees, the Adegree of the future@ in terms of producing creative people who will help this country maintain an edge in creative product development is the MFA degree. Consistent with this thinking, programs that blend engineering and the VPA should develop creative problem solvers to a higher degree possible than that achieved by engineering alone.

Notes

1. This research was supported by a grant from the National Science Foundation (NSF 0235214).

2. ALiberal arts@ refers to the summation of literature, philosophy, art, music, religion, and language. This is consistent with the definition typically cited by the National Endowment for the Humanities (NEH).

3. AVisual & performing arts@ refers to visual art (painting, drawing, printmaking, photography, sculpture and ceramics, etc.), music (both instrumental and voice), theater, and dance.

References

1. Kransberg, M. Educating the whole engineer. *ASEE Prism*. November 1993: 26-31.

2. Jackson, Shirley A. *Engineering and the liberal arts.* Speech given at the Universidad Metropolitana, Caracas, Venezuela, April 26, 2001. (see http://www.rpi.edu/web/President/speeches/universidad.html)

3. Neeley, K., Olds, B., and Steneck, N. Recommendations for liberal education in engineering: A white paper from the liberal education division of the American Society for Engineering Education. Paper presented at the 2002 ASEE Annual Conference and Exposition, Montreal, Canada, June 16-19, 2002.

4. Hawley, R. Engineering and the creative arts: A new frontier? The Royal Society of Edinburg, 2005.

5. Florman, S.C. Learning liberally. *ASEE Prism* November 1993: 18-23.

6. Thorndike, R.L., Hagen, E.P., and Sattler, J.M. Stanford-Binet Intelligence Scale. Nelson Thomson Learning,

1996.

7. Torrance, E. Norms-technical manual: Torrance tests of creative thinking. Benseville: Scholastic Testing Service.

8. Hickey, M. Creativity research in music, visual art, theater, and dance. in: The new handbook of research on music teaching and learning (Colwel, R. and Richardson, C., editors) Oxford University Press, 2002.

9. Schreiner, L. The College Student Inventory: Accurately identifying students at risk Iowa City: Noel Levitz Centers, Inc., 1991.

10. Issues in Science and Technology. The image of engineering. *Issues in Science and Technology* 15(2): 23-24, 1999.

11. Pink, D.H. A whole new mind: Why right-brainers will rule the future Penguin Group, 2006.

Table 1

Summary of the survey participants

PARENTS	Total:		129
	Student in:	IB program	45 (34.9%)
		TE magnet	38 (29.5%)
		General HS	46 (35.7%)
	Student has VPA talent		48 (37.2%)
	Parent has VPA talent[1]		35 (27.1%)
	Parent is college graduate[1]		90 (69.8%)
	Parent is a professional[1,2]		22 (17.1%)
	Student is FTIC[3]		39 (30.2%)
STUDENTS	Total:		230
	Student in:	IB program	59 (25.7%)
		TE magnet	97 (42.2%)
		Genera HS	74 (32.2%)
	Student has VPA talent		81 (35.2%)
	Parent has VPA talent[1]		77 (33.5%)
	Parent is college graduate[1]		180 (78.3%)
	Parent is a professional[1,2]		52 (22.6%)
	Student is FTIC[3]		50 (21.7%)

[1] Positive responses require descriptor applies to at least one parent
[2] AProfessional@ means parent is an M.D., Ph.D., attorney, or licensed discipline
[3] FTIC indicates that the student is the first from his/her family to (plan to) attend college.

Table 2

School environment relationship to student=s VPA talent
(Analysis addresses students with VPA talent only)

PARENT SURVEY

	Total	IB	TE magnet	Genera HS
VPA students	48	27 (56.3%)	12 (25.0%)	9 (18.8%)
VPA students/total students in program	48/129 (37.2%)	27/45 (60.0%)	12/38 (31.6%)	9/46 (19.6%)

VPA activities occur mainly:	At school	30(62.5%)
	Away from school	12 (25.0%)
	Both of the above	6 (12.5%)

STUDENT SURVEY

	Total	IB	TE magnet	Genera HS
VPA students	81	35 (43.2%)	32 (39.5%)	14 (17.3%)
VPA students/total students in program	81/230 (35.2%)	35/59 (59.3%)	32/97 (33.0%)	14/74 (18.9%)

VPA activities occur mainly:	At school	47(58.0%)
	Away from school	23 (28.4.0%)
	Both of the above	11 (13.6%)

Table 3

Parent attitudes toward student VPA participation
(Analysis addresses students with VPA talent only)

Statement: I am very supportive of my child=s involvement in the VPA.

	Total	IB	TE magnet	General HS
Strongly agree	25 (52.1%)	20 (74.1%)	2 (16.7%)	3 (33.3%)
Agree	12 (25.0%)	3 (11.1%)	5 (41.7%)	4 (44.4%)
Neutral	8 (16.7%)	4 (14.8%)	3 (25.0%)	1 (8.0%)
Disagree	3 (6.3%)	0 (0%)	2 (16.7%)	1 (11.1%)
Strongly disagree	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Statement: I feel my child=s involvement in the VPAs will be useful in his/her future profession.

	Total	IB	TE magnet	General HS
Strongly agree	5 (10.4%)	2 (7.4%)	1 (8.3%)	2 (22.2%)
Agree	7 (14.6%)	4 (14.8%)	1 (8.3%)	2 (22.2%)
Neutral	16 (33.3%)	12 (44.4%)	2 (16.7%)	2 (22.2%)
Disagree	17 (35.4%)	9 (33.3%)	6 (50.0%)	2 (22.2%)
Strongly disagree	3 (6.3%)	0 (0%)	2 (16.7%)	1 (11.1%)

Statement: I feel my child=s involvement in the VPAs is generally a good thing.

	Total	IB	TE magnet	General HS
Strongly agree	13 (17.1%)	8 (29.6%)	3 (25.0%)	2 (22.2%)
Agree	25 (52.1%)	14 (51.9%)	6 (50.0%)	5 (55.6%)
Neutral	6 (12.5%)	5 (18.5%)	0 (0%)	1 (11.1%)
Disagree	3 (6.3%)	9 (0%)	2 (16.7%)	1 (11.1%)
Strongly disagree	1 (2.1%)	0 (0%)	1 (8.3%)	0 (0%)

Statement: Participation in the VPA should be encouraged while pursuing an engineering degree in college.

	Total	IB	TE magnet	General HS
Strongly agree	8 (16.7%)	5 (18.5%)	2 (16.7%)	1 (11.1%)
Agree	27 (56.3%)	16 (59.3%)	7 (58.3%)	4 (44.4%)
Neutral	7 (14.6%)	6 (22.2%)	0 (0%)	1 (11.1%)
Disagree	4 (8.3%)	0 (0%)	2 (16.7%)	2 (22.2%)
Strongly disagree	2 (4.2%)	0 (0%)	1 (8.3%)	1 (11.1%)

Table 4

Parent and student attitude towards incorporation of VPA into educational environment (Analysis addresses students with VPA talent only)

PARENT SURVEY

Statement: I would value a high school environment that actively encouraged VPA participation while my child pursued a pre-engineering curriculum.

	Total	IB	TE magnet	General HS
Strongly agree	8 (16.7%)	5 (18.5%)	2 (16.7%)	1 (11.1%)
Agree	27 (56.3%)	16 (59.3%)	7 (58.3%)	4 (44.4%)
Neutral	7 (14.6%)	6 (22.2%)	0 (0%)	1 (11.1%)
Disagree	4 (8.3%)	0 (0%)	2 (16.7%)	2 (22.2%)
Strongly disagree	2 (4.2%)	0 (0%)	1 (8.3%)	1 (11.1%)

Statement: I would value a college environment that actively encouraged VPA participation while my child pursued an engineering degree.

	Total	IB	TE magnet	General HS
Strongly agree	8 (16.7%)	5 (18.5%)	2 (16.7%)	1 (11.1%)
Agree	27 (56.3%)	16 (59.3%)	7 (58.3%)	4 (44.4%)
Neutral	7 (14.6%)	6 (22.2%)	0 (0%)	1 (11.1%)
Disagree	4 (8.3%)	0 (0%)	2 (16.7%)	2 (22.2%)
Strongly disagree	2 (4.2%)	0 (0%)	1 (8.3%)	1 (11.1%)

STUDENT SURVEY

Statement: I would value a high school environment that actively encouraged VPA participation while I pursued a pre-engineering curriculum.

	Total	IB	TE magnet	General HS
Strongly agree	8 (16.7%)	5 (18.5%)	2 (16.7%)	1 (11.1%)
Agree	27 (56.3%)	16 (59.3%)	7 (58.3%)	4 (44.4%)
Neutral	7 (14.6%)	6 (22.2%)	0 (0%)	1 (11.1%)
Disagree	4 (8.3%)	0 (0%)	2 (16.7%)	2 (22.2%)
Strongly disagree	2 (4.2%)	0 (0%)	1 (8.3%)	1 (11.1%)

(Table 4 - continued)

Statement: I would value a college environment that actively encouraged VPA participation while I pursued an engineering degree.

	Total	IB	TE magnet	General HS
Strongly agree	8 (16.7%)	5 (18.5%)	2 (16.7%)	1 (11.1%)
Agree	27 (56.3%)	16 (59.3%)	7 (58.3%)	4 (44.4%)
Neutral	7 (14.6%)	6 (22.2%)	0 (0%)	1 (11.1%)
Disagree	4 (8.3%)	0 (0%)	2 (16.7%)	2 (22.2%)
Strongly disagree	2 (4.2%)	0 (0%)	1 (8.3%)	1 (11.1%)

Table 5

Summary of the Riverview High School Engineering & The Arts program

- Students enter in 9th grade at Riverview High School (RHS), declaring their intention to follow the pre-engineering track as part of the Edison I.D.E.A.=s SLC.
- Students will also simultaneously complete four courses in the Creative Arts SLC, focusing on either the Visual Arts (painting, drawing, photography, and ceramics) or the Performing Arts (music and theater).
- An AEngineering and the Arts Society@ will be established at RHS that will interact with the University of South Florida (USF) student organization of the same name.
- USF students and faculty will serve as mentors for the RHS students.
- A pathway will be defined that allows interested students to move seamlessly into the USF engineering program (and parallel pursuit of the undergraduate Certificate in the Arts).