Successful Engineering Technology Summer Programs: 
Recruitment Tool, Educational Experience or Both?

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Abstract

Typically, summer high school programs offered by engineering technology (ET) faculty are designed with the main purpose of inspiring high school students to pursue engineering technology degrees or in other words, to “recruit” them into engineering technology programs in higher education. Unfortunately, it is very difficult to measure success of a program in terms of recruitment since it is difficult to track students 2, 3, or 4 years after attendance in a summer program to determine if they have pursued an ET program either at the offering institution or at an alternate institution. Furthermore, most high school students who attend a summer engineering technology program are already interested in the general field so even if data can show that a high percentage of students who attend these programs do go into the field, how can the summer program itself be identified as the determining factor for recruitment? Therefore, measuring the success of a summer program may be tricky if the only goals set for evaluation are based on recruitment. Rather, it may be more appropriate to base the evaluation of the program on knowledge acquisition and student learning even though the focus is for high school students.

At Purdue University Northwest (PNW), the Engineering Technology Department has held three summer programs between 2013 and 2016. The sponsorships of these programs have varied over the years and with this, the goal of the programs have also varied. Internal sponsorship from the ET Department or College of Technology (COT) has generally led to a focus on recruitment to the University programs. External sponsorship, while focusing on general recruitment into STEM fields, has added engagement goals as a focus for the program as well. But after several years of “successful” ET summer programs at PNW, the ET faculty and staff are asking “what should be the true goal for our future programs?”

This paper will present a discussion of the evaluation results for three years of summer high school ET program offerings at PNW along with review of various types of summer ET programs developed for high school students at different institutions. Goals and results of the different programs will be explored along with suggestions for future opportunities.

History of Engineering Technology Summer Programs at PNW

It can be said that summer high school ET programs strive to be “successful,” but just what does success mean? Does success mean having a large number of students apply to your program with high participation rates? Does success mean accomplishing specific academic goals? Does success mean recruiting students to your particular campus or into any ET program across the
country? Of course success means accomplishing whatever you have set out to get done and so success of an ET summer high school program could mean any or all of these things.

The ET Department at Purdue University Northwest (PNW) began offering ET summer programs for high schools students during the summer 2013. Prior to this, summer programs offered at PNW were offered either on a more general level in conjunction with the University’s engineering programs or on a very specific level such as a camp for one particular ET program. As of 2013, the ET summer programs for high school students were offered at a department level and were focused to recruit students to all ET programs offered at PNW. This included programs in Electrical Engineering Technology, Mechanical Engineering Technology, Mechatronics Engineering Technology and Construction Engineering and Management Technology.

The summer program offered in 2013 was a program funded internally by the PNW Engineering Technology Department. The main goal of the program was to recruit students from the local region into the various ET programs. As a regional Purdue campus, a major thrust of the university mission is to serve the needs of the regional community. As such, it was reasoned that funding the program internally was akin to using the funds for marketing purposes which was in-line with strategic initiatives resulting in approval of funds for this purpose. Therefore, the program was offered free of charge to participants in 2013.

The summer program offered in 2014 was funded through internal and external funds provided from the ET Department and the Indiana Space Grant Consortium (INSGC) Grant Program. It was again offered free of charge to local high school students. This time the main program goal shifted to focus on the INSGC goal requirements which included engaging and inspiring STEM literacy.

The next program offering was in 2016. This program returned to internal funding sources with the majority of the program costs being funded by department and college funds with the understanding that the main focus of the program should again be on recruitment of students from the local region. However, for this offering a minimal $25 registration fee was charged to cover administrative costs of registering students. ET faculty considered the possibility of self-funding the program by charging a full fee to students to participate, however, it was agreed that charging a substantial fee for participation could affect the major goal of the program since the program was intended to encourage participation from the local region and maintain diversity within the program equivalent to that of the region. In order to accomplish this, cost of the program for local students must not become a barrier. It was for this reason that the majority of funding for the 2016 offering again came from internal sources, however, funding of the program on a regular basis going forward is an issue and is something that must be addressed for continuation of the program.

Review of Other Engineering Technology High School Summer Programs

For the most part, summer programs offered by ET faculty are quite similar to those offered by engineering faculty. The high school audience’s background limits the level of complexity or depth of theory covered in these programs creating almost no differentiation at this introductory
level. At PNW, the engineering faculty have offered summer programs since the 1990’s with the help of ET faculty and staff. These engineering summer programs have historically been richer in industry tours with the more recent ET summer programs richer in lab-based activities. However, introductory programs such as these can typically be grouped together for review as there is essentially no discernable difference in these programs other than the designation of the faculty sponsoring the program.

Porter et al\textsuperscript{2} at Texas A \& M, Kuyath et al\textsuperscript{3} at UNC Charlotte, Yousuf at al\textsuperscript{4} at Savannah State, Zhang et al\textsuperscript{5} at N.Y. City College of Technology, and Sala et al\textsuperscript{6}, at Baker College, all from ET programs are excellent examples of summer programs that currently number in the hundreds according to “Engineering Summer Camps” by the Engineering Education Service Center\textsuperscript{7}. In 2016, there were 15 summer camps for engineering or engineering technology in Indiana alone. Most of these programs’ general goals are similar to those of PNW’s ET summer program:

*Goal 1: Promote the University, especially the ET programs.*
*Goal 2: Attract students, especially women and minorities to the discipline.*
*Goal 3: Expose students to the subject matter, by engaging and inspiring them so they can visualize themselves successfully pursuing a career in science, technology, engineering, or mathematics (STEM).*

To accomplish these goals, programs have used varying approaches with some extending beyond simple isolated summer programs. One summer camp at the University of North Carolina at Charlotte in 2004 developed a program funded by NSF to increase diversity of engineering and engineering technology students by focusing on high school engineering clubs. Their strategy was to engage students in STEM activities through the establishment of engineering and engineering technology clubs at high schools with the summer camp being an extension of these clubs.\textsuperscript{8}

Another approach developed at Texas A&M focused on using a robotics program as a recruiting and outreach program. By 2011 they had developed their Krisys workshops using the Krisys Robot Platform as a way to introduce high school students to the opportunities that exist in pursuing an undergraduate degree in engineering technology. Their main goal was to create better name recognition among high school students.\textsuperscript{9} A main lesson learned from their experience with the Krisys platform was that a low-cost alternative was needed to get branded give-aways in the hands of younger students while igniting excitement in the engineering technology fields. By 2012 they had secured private funding to develop an alternative low cost E-Clock kit for this purpose as well as securing funding to expand their work with the Krisys platform.\textsuperscript{10}

In 2015, Purdue Ploytechnic launched a novel recruitment initiative that was not a “summer program” but rather a ½ day event for high school students. The event, Purdue Mission to Mars (PMTM), provided an integrative experience where students worked in teams to learn and apply new skills in leadership, engineering technology and computer graphics. This was a learn-by-doing approach to high school recruiting. Students were asked to role play as if they were design engineers and other relevant functional roles. They actually programed robots, modeled in SolidWorks, 3D printed and tested their designs all in a ½ day span of time.\textsuperscript{11} Because of its
short time frame and integrated approach, this model provides effective impact for recruitment of students into the STEM disciplines. This type of program is a model that can be utilized throughout the year not just during the summer when students and faculty have extra time to attend more lengthy events/camps/workshops.

**Assessment of PNW Engineering Technology High School Summer Programs**

Over the recent three summer offerings, the assessment of the ET summer programs at PNW has changed minimally. The typical assessment instrument, end of day surveys and end of program surveys, has been utilized.

The first year that the program was offered in 2013, it was initiated from knowledge of a downturn in enrollments at the University and the faculty believed that a summer program was a good marketing tool to bring in local high school students. That stated, the general goal of the summer program was to develop awareness of the PNW Engineering Technology Department programs within the region. No specific goals were written down, no formal plans were detailed out. It was simply a chance for any faculty members who wished to showcase the programs they were involved in to do so. Interested faculty graciously donated their time to organize and produce the summer program without compensation. Eight faculty, staff and administrative personnel conducted the program that year. Assessment was minimal, simply a daily reflection log gathering qualitative information about what students learned or liked or did not like. Funding for this program was minimal. It was funded completely internally from department funds. In 2013 there were eighty-three (83) high school students that participated in the program after one hundred ten (110) originally signed up.

The second year the program was run, 2014, the program was more formally organized. Goals were documented and partial external funding was secured from the Indiana Space Grant Consortium (INSGC) Grant Program. This allowed the department to improve the program and find additional ways to excite the potential students. Several additional major purchases were made bringing equipment to the department that would be initially used for the summer program, but could then be integrated into freshman experience courses or used for open houses to showcase the programs at later dates. This funding was a step forward in allowing the ET Department the ability to secure appropriate equipment and materials as well as expanding the summer program to provide a student mentoring component (graduate and undergraduate students were hired to mentor the high school students during the program) however, the faculty involved, again did so without summer compensation. Also, assessment was improved to translate some of the qualitative data to quantitative data in order to assess the outcomes of the students from several perspectives. The primary goal of the 2014 program was to engage and inspire 9-12 grade students into the STEM disciplines. There were thirty-five (35) high school students that participated in the program after forty-three (43) originally signed up.

In 2015, faculty found it difficult to continue to volunteer their time for a 3rd year without compensation for their time over the summer. Therefore, no ET Summer High School program was offered through the ET Department at PNW in 2015.
In 2016, the ET Department in conjunction with the College of Technology at PNW, identified funds to provide a stipend to faculty interested in contributing their time to a 2016 summer program for high school students. The 2016 program followed a similar format to the one presented in 2014. Assessment was altered during the 2016 year to gain information on learning outcomes of each workshop topic rather than simply gathering survey data on student’s daily reflections of knowledge gained. Therefore, it can be stated that the goals of the 2016 summer program were again to engage and inspire 9-12 grade students into the STEM disciplines but now also to impart knowledge of CAD/CAM, Radio frequency identification (RFID), Nanotechnology, Robotics, Electronics, Mechanical systems and Surveying to 9-12 grade students. Learning objectives for each of the topics to be taught were developed and assessed along with similar daily reflection logs that were used in the 2013 and 2014 programs. In 2016 there were nineteen (19) high school students that participated in the program after twenty (20) originally signed up.

Summary of Results of PNW Engineering Technology High School Summer Programs

In summary, the assessment of the programs evolved over the years along with the goals of the programs. In 2013, the program goal was undocumented and focused on improving student enrollment numbers in the ET Department. As of fall 2016, only one student from the 83 participants (1.2%) in the 2013 summer program has entered an Engineering Technology program at PNW.

The 2014 ET summer high school program was more formalized and while it had less participants, only 35 participants, two student (5.7%) from this year had enrolled in an ET program at PNW as of fall 2016. The goals this year focused less on recruitment and more on engagement. New equipment was secured and students appeared to notice the difference.

The 2016 ET summer high school program then looked to quantitatively assess the learning component of the program. This year there was a complete shift away from recruitment to focus on engaging the students in the program activity rather than trying to simply “recruit” them. In 2016, there were 19 student participants in the program, none of which had yet graduated high school as of fall 2016.

The qualitative data from the 2013 program was from daily student reflections (Figure 1). The questions asked were of an open-ended nature requesting that students “describe something that you learned today that you did not previously know” and “what about today’s topic interested you?” These questions were not intended to assess the program but rather to get the students to reflect on what they had done during the daily session. As expected, when learning about basic electricity, the majority of students put down that they learned about ohm’s law and when they learned about drawing in CAD and then watched the designs come to life on the CNC machines they stated that they learned how easy it was to transfer a design into reality using CAD/CAM.
In order to continually improve the program, in 2014 additional metrics were added to assess the program goals. A final summary of the program requested data that could be displayed both qualitatively and quantitatively (Figure 2).
Basic qualitative data asked that students identify “the most interesting thing learned” during the program. But then, in addition, it had them rate on a Likert scale from 1 to 5:

- How likely are you to consider Engineering Technology as the starting point for your career path?
- How likely are you to consider PNW as your ‘destination of choice’ for your college degree?
- Has your interest in Science, Technology Engineering and Math (STEM) education and careers changed as a result of the workshop?

The qualitative data essentially showed that the student interests in the program presentations varied almost with each student. There were six sessions presented with six major topics but at least eleven different topical answers expressed by the students. This means that they all viewed the sessions differently taking away different pieces of the presentations. The major topics taught were:

1) electricity and electrical circuits,
2) logistics with use of radio frequency identification (RFID) and nanotechnology,
3) computer aided drafting and manufacturing (CAD/CAM),
4) construction management and surveying,
5) gears and mechanical systems, and
6) programmable logic controllers (PLCs) and simulation.

Most topics listed by the students had one or two students indicating the particular topic was most interesting. They listed items such as electrical engineering, mechanical engineering, nanotechnology, surveying equipment, making rockets, CAD/CAM, welding and others. The only topics that had multiple students indicating them to be the most interesting were CAD/CAM and welding, all other responses were as individualized as the students.

So the 2014 qualitative data showed that if the PNW ET Department were to focus on a target group of students to recruit, it may make sense to look at the students interested in mechanical engineering topics since students identified CAD/CAM and welding at the most interesting topics in the program. Of course, this could also have been that these were the most engaging programs rather than the programs that most students may find interesting for a career choice.

The 2014 quantitative data was more straightforward. When the students were asked if they would consider engineering technology as the starting point for their career path 75% indicated strong consideration to most likely that they would consider engineering technology as the starting point for their career path with 0% indicating they were not likely to consider engineering technology as the starting point for their career path.

When the students were asked if they were likely to consider Purdue University Northwest as their ‘destination of choice’ for their college degree 56% indicated they were likely or most likely to consider PNW as their ‘destination of choice’ for their college degree with 38% indicating they may consider PNW as their ‘destination of choice’ and only 6% indicating they were not likely to consider PNW as their ‘destination of choice’ after completing this workshop.
Finally, when asked if their interest in Science, Technology Engineering and Math (STEM) education and careers changed as a result of the workshop 44% indicated that attending the summer program more than slightly to greatly increased their interest in Science, Technology Engineering and Math (STEM) education and careers, 44% indicated that attending the summer program slightly increased their interest and 12% indicated that attending the summer program did not change their interest level.

Overall, the data was interesting but not necessarily definitive in determining what a future program should focus on.

In 2016 the program therefore shifted to start assessing the learning outcomes of each session (Figure 3) along with what the students found interesting each day through their daily reflection logs. This time, their interests were again very diverse, but even when a student indicated that they were not interested in the daily topic, their corresponding response to the learning outcomes indicated that they still learned the material that was intended for the day. It was also questioned if the lickert scale used in 2014 was useful. Questions such as “How likely they were to consider PNW as their ‘destination of choice’ for their college degree” were changed to a yes/no outcome response (Figure 4) along with reformating of other questions. For 2016, 63% of the participants indicated PNW would be one of the universities they apply to for college.

After 2016 it became apparent that the PNW faculty need to review the goals of the program and how to gather the assessment statistics in order to make it meaningful in designing future programs.
Discussion of Future Summer Programs for the ET Department at PNW

For design of future programs several items need to be considered:

1. Funding and resources
2. Student participants and interest
3. Goals of the program

1. Funding and resources
As with any activity, resources are always a top priority. In order to continue to offer a summer program, the appropriate resources must be secured. This includes materials, equipment and labor. And of course, to utilize materials, equipment and labor most effectively there must be a vision and goals for the program that drive it to achieve a master plan. If there is an external funding source, the goals of the program will need to achieve the required vision of the funding source. If the funding is internal then the goals only need to achieve the vision of the internal funding source. Ideally, as with the 2014 external funding source for the PNW program, external sources of funding can be found that have goals that align with the University allowing for a well-designed summer program to achieve external and internal goals simultaneously.

Funding requirements begin by determining what the program should accomplish. After running programs for three years, the faculty in the PNW ET Department have determined that there are three major questions that affect funding amounts and program design:

- How many students will we service?
  - small cohort of 20
  - as many students as will come, up to 100
- What type of students will we service from our local region?
  - only top of the class
  - any students who are interested
- What are we trying to do for the students?
  - engage them and make them aware of various programs and careers
  - impart new knowledge

Material costs - Past funding of the PNW summer programs show that materials needed to support a summer program, whether it is for 20 or 80 students, will be approximately $1000. In 2013, much was spent on coping costs and items that were not needed. Material will also be affected based on how the activities are designed and how engaged the students will be. Costs can be cut by grouping students in activities to reduce the material required, but engagement is higher when each student more fully participates by having their own material that they can directly engage in the activity with.

Labor costs - Labor for student workers and faculty were found to be the biggest expense, and this will fluctuate depending on how many students are serviced. Looking at labor as a function of how many students were serviced, approximately $3,700 was used to service approximately 20 students in 2016. This roughly translates to $185/student. In the prior years, much of the faculty time was donated which reduced labor cost but cannot be counted on for sustainment of a quality program.
Equipment Cost – Equipment cost has varied from year to year with the largest funding in 2014 to purchase seven (7) of the Lego® Mindstorm EV3 Core Sets and a 3D printer. The funds were associated with the summer program, but obviously they were not confined to be used solely for this purpose. Additional Lego® Mindstorm EV3 Core Sets were purchased at a later date to increase the number of sets for use in classes as were additional 3D printers. So it can be questioned if this cost should really be associated with the program. It can be argued that this purchase was beneficial to the ET Department since it validated the use of the equipment and the need for it in the curriculum. Either way, equipment purchases such as this do not need to be an added expense for future offerings since they now exist as part of the department inventory.

Based on the cost breakdown from the summer programs (Figures 5 and 6), it can be seen that the least funded program was the 2013 program which served the highest number of participants, but just because it promoted the University by bringing awareness to the most students, it is questionable if it was the most effective program to expose students to the subject matter, by engaging and inspiring them so they can visualize themselves successfully pursuing a career in science, technology, engineering, or mathematics (STEM).

<table>
<thead>
<tr>
<th>Purdue University Northwest</th>
<th>Engineering Technology High School Summer Workshop - Total Direct Costs</th>
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</thead>
<tbody>
<tr>
<td>Direct Costs</td>
<td>No. Participants</td>
</tr>
<tr>
<td>2013 $2,444</td>
<td>83</td>
</tr>
<tr>
<td>2014 $7,112</td>
<td>35</td>
</tr>
<tr>
<td>2016 $4,710</td>
<td>19</td>
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Figures 5
PNW ET summer high school program Total Direct Costs

<table>
<thead>
<tr>
<th>Purdue University Northwest</th>
<th>Engineering Technology High School Summer Workshop - Cost Breakdown</th>
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<tr>
<td></td>
<td>2013</td>
</tr>
<tr>
<td>Materials</td>
<td>$1,269.00</td>
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<td>Labor-student workers</td>
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<tr>
<td>Labor - Faculty</td>
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<tr>
<td>Food</td>
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<tr>
<td>Total</td>
<td>$2,444.00</td>
</tr>
</tbody>
</table>

Figures 6
PNW ET summer high school program Cost Breakdown

2. Student participants and interest
Faculty noted that the interests in the various items explored in the programs varied almost as widely as the number of participants themselves. Most of the answers regarding what interested the students most (after they completed the program) resulted in very few of the participants...
answering in the same way. The students listed their interests as nanotechnology, electrical engineering, mechanical engineering, civil engineering, manufacturing, computer science, welding, CAD, CAM, computer simulation, rocket building and they even listed topics the program did not cover such as graphic design and game design. Essentially, it was surmised that without recruiting from or for any specified program, just general engineering technology, students from all different backgrounds looking at many different possible careers decided to use the summer programs offered through PNW’s ET Department as a vehicle for career exploration.

Another result noted was the change in student interests over time. In the 2014 program at PNW, 31% of the participants indicated they were interested in the topic of CAD/CAM with 25% interested in welding while only 13% were interested in robotics. In the 2016 program at PNW, 44% said they were interested in robotics while only 25% were interested in CAD/CAM. During the 2016 program, a new professor became involved with the summer program and his focus was to engage the students in robotics, while the CAD/CAM engagement activity remained the same. Do the instructor and engagement activity affect the student perception of what interests them?

In addition to interests of students, it was noted that even though some students indicated they were not interested in the topic of a particular day, when assessed on the learning outcomes of the day, the students, even those not interested, did note they had learned something from the topic. So should a program be designed to the interest of the student or should it be designed to teach and engage the student thereby leaving the student to determine how their abilities and interests align?

3. Goals of the program
The final issue that faculty at PNW noted were that the goals of the program are going to impact the logistics and design of the program. As previously indicated, there were three basic goals each year the program was offered with varying emphasis placed on each goal depending on funding sources and faculty involvement.

The 2013 summer program focused on student recruitment with a primary emphasis on goal 1.

**Goal 1: Promote the University, especially the engineering technology programs.**
A large number of students participated in the 2013 program (83 students), but the program activities were less engaging than when done with fewer students. The students had to do everything in groups because funds and time did not allow for the large number of students to do everything individually. Presentation styles included the lecture hall style welcome and conclusion with heavy emphasis on the institution and things that did not necessarily engage or interest the participants. It had, in essence, an “open house” feel to the activities. This may be useful to introduce parents and participants to the University and make decisions regarding college admissions, but most 9th and 10th grade students are not yet considering this decision and the program is supposed to be focused on them. Of course it was not all negative, even with a large number of participants there was still opportunity for engagement as can be seen in Figures 7 and 8 during the rocket launch of the 2013 program. Here we see an instructor with a high school student using an altimeter to measure the height of a rocket and another instructor going over the basics of rocket launching.
The 2014 summer program focused on two goals to satisfy an outside funding source.

**Goal 2: Attract students, especially women and minorities to the discipline.**
Local students were recruited from local high schools and no registration fee was charged so as to not create any barriers to access the program. There was however no specific design to the program to encourage women and minorities to enroll and there was no measurement tool designed to track the diversity of the participants.

**Goal 3: Expose students to the subject matter, by engaging and inspiring them so they can visualize themselves successfully pursuing a career in science, technology, engineering, or mathematics (STEM).**
New equipment was purchased to specifically create more engagement activities for participants and the program was capped at 40 participants to ensure a more reasonable student to instructor interaction. College students were also hired to participate as mentors to the high school students to increase the participants’ opportunities to learn about ET and college in general. The lecture hall presentation styles used for the 2013 program were eliminated so that all student interaction and learning was conducted in a more intimate setting.

The 2016 summer program focused on all three goals with a return to focusing on recruitment of students to improve enrollments in ET programs at the University in coming years.

**Goal 1: Promote the university, especially the Engineering Technology programs.**
Sixty three percent (63%) of the participants in 2016 said they would apply to PNW.

**Goal 2: Attract students, especially women and minorities to the discipline.**
Nearly half the participants in 2016 were women or minorities.

**Goal 3: Expose students to the subject matter, by engaging and inspiring them so they can visualize themselves successfully pursuing a career in science, technology, engineering, or mathematics (STEM).**
When the high school participants were asked which of the areas explored interested them the most, many indicated multiple topic areas now interested them and when asked if the program was worthwhile in helping them figure out what they might want to do for a career, 88% said yes, worthwhile, and indicated they were leaning toward engineering or technology related careers.
From what the ET faculty at PNW have learned, the primary goal of a program such as this needs to be teaching by engaging and inspiring students. This is what these student expect, they are not expecting college recruitment at a summer program. The recruitment should only be secondary as a fall out to working with inspiring professors and student mentors, well equipped labs and activities that are fun and engaging. Similarly, recruitment for diverse demographics should not be a primary goal for a summer program but rather be accommodated through the logistics of how or where a program recruits participants, how barriers such as cost are accommodated or how the topics are presented.

**Concluding thoughts**

Summer programs are a worthwhile activity for engineering technology programs. High School students are often unsure of what an engineering technology degree would mean for them in terms of their studies and follow-on careers. These programs help provide an avenue for high school students to become familiar with how an ET degree can help them achieve their career goals.

A successful summer high school program is not necessarily one that attracts a record number of students, it is not necessarily one that has large funding sources. Success of an engineering technology summer program for high school students should be one that teaches students the various topics that will be taught in the actual degree program at the offering institution utilizing methods that are engaging for the students. If there are sub-goals to the program such as a focus on minorities and diversity of STEM programs then the logistics of the program must be altered to accommodate removal of barriers to attracting the specified target group. If there is a sub-goal to enhance enrollment in a specified focus area of engineering technology such as one particular program at the offering institution, then again the logistics of how to recruit students with potential interest in that specified area must be taken into account. If there is a sub-goal to recruit to the offering institution then logistics of the program can be altered to accommodate an introduction to the university itself and metrics to track this sub-goal outcome must be put in place as collection of the outcome metrics of this sub-goal are on-going and cannot be measured at the end of the program.

All summer high school engineering technology programs should first and foremost be designed to teach students concepts that will be taught in the degree programs. This will help students visualize the value-added aspect of an engineering technology degree. Learning outcomes can then be assessed similarly to how faculty measure student learning outcomes in the traditional classroom. From this, students will be able to make the fundamental decision if a program such as this would be something they would be interested in pursuing to set the foundation for their future career. Additional sub-goals then need to be accounted for to design the program logistically to incorporate things such as recruiting from a specified demographic or measuring beyond the immediate outcomes of the program to determine if long-term outcomes are being accomplished.
Bibliography

1. The Purdue University Northwest mission and vision http://www.pnw.edu/learning-technologies/about-oit/purpose/

Biographical Information

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