GREATER LAWRENCE TECHNICAL SCHOOL
57 River Road, Andover, Massachusetts 01810

PROGRAM ADVISORY COMMITTEE
MEETING MINUTES
April 29, 2021

A meeting of the Greater Lawrence Technical School Program Advisory Committee was held on April 29, 2021, at Greater Lawrence Technical School.

The following members were in attendance:

Facilitator: Cherilee Lewis	**CTE Program:** STEAM Innovation
Recorder: Michael Darish/Taqua Turner	Biotechnology
Materials Manager:	Engineering Technology
Dialogue Monitor: Chris W	
Timekeeper:	
Faculty Present	
Michael Darish	
Chris Waterworth	
Tim Jones	
Melanie Lamoy	
Panagiota Athinelis	
Advisors Present	**Name of Business / Population Represented**
(Chairperson)	Acme Company (Example)
Steve Bedrosian	
Renee Procorpio-Melina	Pfizer
David Kazmer	UMass Lowell
Peter Gains	U Mass Lowell
Francisco Brea	
Joan Shein	
Guest Present	
Paul Robinson	MPI Industries (Example)

Agenda Item #1: Call to Order

a. Welcome/Introductions

Status report:

Ms. Lewis called the meeting to order at 5:11 pm.
Will do break out rooms related to your area.

i. **PA: In the process of expanding the Academy**
ii. **Will be reaching out before Fallo for your input**
iii. **Steam Academy is here to stay**
iv. **This meeting is focused on transitioning out of the Pandemic mode**

Agenda Item #2 Verification of committee members' contact information, phone numbers and emails.

a. Please verify the e-mail address for each member.
b. Per DESE PAC Guidelines, it is important that every effort has been made to ensure the membership of our Advisory Boards are inclusive and diverse. Review the **composition populations** listed on the Program Advisory membership forms. Ask members to sign-in using the Google Form (Share link with all members) and ask that they select any of the sub-groups they are able to represent.
    i. Persons of racial or linguistic minorities.
    ii. Persons are nontraditional by gender for the program.
    iii. Persons are well-equipped to represent the perspectives of persons with disabilities.

Status Report:

a. Email Addresses have been verified for each member. (Example)
b. Facilitator asked for members to review representative populations. Union representation was updated. (Example)
c. Email Addresses have been verified for each member
d. Peter Gaines has a room change to Olsen 201

REPORT OF OLD BUSINESS

Agenda Item #3: Minutes

a. Review minutes from the Program Fall Advisory meeting, and voice comments, questions, or concerns (Minutes are posted on the GLTS website).
b. Provide an update on action items from the previous meeting. (The facilitator should recap the conversation and make a motion to approve.
c. Solicit a motion to approve minutes, 2ND the motion.

Status Report:

a. (Record Action, for example:: "Minutes from the Fall Program Advisory Board meeting were reviewed").
b. (Record Discussion)
c. Solicited a motion to approve minutes, 2ND the motion.

Reviewed actions items from previous meeting
In person learning has been going well.
Motion: David Kazmer
2ND: Renee Procorpio-Melina
Vote: Unanimous

NEW BUSINESS

Agenda Item #4: CTE Program Facilities Review

a. Should we be looking at replacing any capital equipment ($25,000 or more) within the next 5 years?
b. Are there any new tools/equipment/facility updates and upgrades occurring in Industry that we should be aware of and consider to include?

Status Report:

a. **Review shop facilities and equipment.** (Program Lead Teacher may elect to conduct a virtual tour of the shop space for participants who attend the meeting remotely).

i. **Does the current shop design meet current industry standards?** (Are there any safety concerns, repairs needed, is the layout of the facility functional, is there adequate storage, are there any cosmetic renovations required)

i. **Review facility and NIOSH Checklist Review** (Each Program Lead should provide their PAC with a copy of the applicable NIOSH Checklist for review)

1. What feedback or insights can the PAC provide?

Chris Waterworth discussed the Makerspace capital equipment
Laser Cutter, vertical and horizontal band saws, Bosch router table and router, small CNC, Planer, additional vertical band saws, 3 Prusa 3D printers,

Dave Kazmer: CNC router is heavily used, CNC lathe, circuit board printer.
Stratysis is coming off their patents. SLA printers provide more resolution.
Steve Bedrosian: Most tools are software controlled - What emphasis is there in coding techniques? What does the local industry use? It would be good to equip the students with these skills: Python, C, G-Code, etc.
Invest in the coding that could be done as homework...perhaps doing it online simulation.
PA: 3D printers are heavily used
Chris: Discussed "Predator" software used in the machine shop that proves out code in a simulation.
Dave: G-code used for 3D printing as well.
Frank: Agrees…..especially with coding and simulations.
DK: Are there two accreditations?
The last paragraph is a bit passive. The student outcomes at the college level is written such as "the student will be able to" to make it more attractive for employment.
Steve: Instead of gaining an understanding….they are "gaining the skills" to obtain and demonstrate for entry level employment. G-code and general coding skills are important to employers. Dimensions, materials, x,y,z coordinates. Visualize or simulate before creating something. Equipment set up and operation.
DK: Python is a very popular language. Have students write a Python program that outputs a G-Code. The idea of a portfolio for students to show examples of their work. 3D CAD, sketching,
Frank: Presentation skills - explain what they made and how it works…..important in engineering.

Biotechnology:
Peter Gaines- Bioreactor
Producer cells are needed if it's worth doing
CHO cells that have been transduced/genetically modified with Gene for stem cell factor. So they constantly spit out the stem cell factor.
Conditioned media- exact same concept of what they are doing in a bioreactor to over express the Concept you want to get across is the cells that pump out something. Like a cytocine you could do an ELISA. Or harvest the media and purify you could do a Western or SDS PAGE when stained by Coomassi.
What you do need. Electrophoresis/ ELISA/ SDS PaGE

1. Quantitatively measuring the protein that is being produced
2. Show that there is protein there and it has a biological effect.

This is Simple, easier you can titer how much the cells are producing. This is a good example of how we create a product.
The point would be specificity.

As long as you have parental cells he could supply us the transfected cells. Could have his students do this as a project to check it out and quantify.

Plate reader would open up a whole bunch of different opportunities for the students.
Cell titer glow
Cyquint
Biocompatiability
Toxicity assays
Cheap way to analyze the cells using 96 plate wells
Used on a routine basis.
Bioreactors- best experience is for them to get field trips to see it, field trips.

Example: Fisherbrand 96-well plate microplate reader with wide spectrum of fluorescence capacity run $5500-$7600, just as an example.

Norline/Renee
Single use technology
Bags that go on a shelf 3L bags small scale that are disposal
1000L plastic bag that for large scale
More efficient turn around time
Better off with shake flask experiments
Shake flasks would need a suspension cell line.
Trypsinizing
Hemocytometer
Inverted microscope
Camera's on microscopes are necessary- critical learning
Data analysis
$1000-5000-must be compatible with your microscope
Chromatography
Protein A drip columns
Problem solving
5 W 2 H
How do you come up with the right questions?
What are the potential solutions? What plan would you develop?
Utilize mentor program to help with problem solving the things above.
Reach out to Microsoft to see if they will help us out.

Recommendations: See Below

PA: Circuit board printer, SLA printers too, g-code

Motion: Steve Bedrosian motioned to move recommendations forward.
2nd Motion: Steve Bedrosian
Vote: Unanimous approval

Plate reader for absorbance, luminescence and fluorescence would be ideal

Motion: Peter Gaines

2nd Motion: Renee Procopio-Melina

Vote: Unanimous

Shaker flasks

Motion: Norline Walker

2nd Motion: Peter Gaines

Vote: Unanimous

Live Imaging Cameras for microscopes

Motion: Peter Gaines

2nd Motion: Norline Walker/Renee
Vote: Unanimous

Excel certification
Motion: Norline Walker
2nd Motion: Peter Gaines
Vote: Unanimous

Multi Channel Pipette
Motion: Joan Shein
2nd Motion: Renee Procopio-Melina
Vote: Unanimous

pH meters
Motion: Peter Gains
2nd Motion: Renee Procopio-Melina
Vote: Unanimous

Agenda Item #5: Program Review

a. **Review Drafts of Program Information Sheets** (Leads to share or project Program Information Sheet for feedback)

Status Report:

a. Review proposed Program Information Sheet

i. (Record Discussion)

Recommendations: See above
Motion: Steve motioned to accept
2nd Motion: Dave seconded
Vote: Unanimous approval

Agenda Item #6 Equipment / Budget
Review Proposed Budget for FY21/22 & Prepare Budget for the upcoming school year (SY22/23)

a. Review Proposed FY21/22 Budget and begin Draft Budget for FY22/23.

i. Review the Proposed Budget developed for the upcoming school year FY21/22. In thinking about our next budget (FY22/23), are there any new purchases we should plan for?
ii. Is the program equipped with equipment and supplies that will support preparing students for entry into the industry?
iii. What tools and/or equipment are cost-prohibitive to repair and should be replaced?
iv. What tools and/or equipment should be replaced within the next 5 years?
    i. If yes, is there a specific manufacturer or model that we should request for equipment recommended?

Status Report:

a. Review Proposed FY20/21 Budget and begin Draft Budget for FY21/22

i. (Record Discussion)
ii. (Record Discussion)
iii. (Record Discussion)
iv. (Record Discussion)

Recommendations: (Example: "It was recommended by the board that....")

Steve: What do you have for computing sources:
PA: We have Chromebooks for each student and some Thinkpads in tough shape
Chris: MasterCam and Solidworks available on a Server
Steve: Can they do a virtual desktop from their house?
Chris: Yes
Steve: Do they really use it?
Chris: They have been using Onshape and it has been working well with the students' Chromebooks.
Frank: Is Onshape OK….how is the mousing?
Chris: Touchpad not good….but we sent mice home to the students and it works great.
Frank: Not effective to get them monitors at this time.

No specific recommendations
DK: Cloud based software is the trend. Maybe recommend better Chromebooks. There is a trend toward collaborative design work.
Chris: Onshape is doing that and works better than Solidworks for that.

Motion: David Kazmer motion to approve recommendations
2nd Motion: Francisco Brea seconded
Vote: Motion Carried

Agenda Item #7: Curriculum

a. Is there any new technology or techniques that we should be teaching our students?
b. How has the Industry evolved over the past year? Are there any new skills that are now required to be successful in the industry?

Status Report:

a. Frank: Do you have Agile at all in your curriculum? Answer is No
b. It appears to be a trend.
c. It is a philosophy

Chris: Affoa is using it.
PA: Has just gone through master training in it. It is definitely a trend.
Frank: The kids might gravitate towards it. This may help students break their project into smaller parts.

Recommendations: Frank Recommended exposing students to the Agile process
Motion: Francisco Brea
2nd Motion: David Kazmer seconded motion
Vote: Motion Carried

Agenda Item #8: Cooperative Education/Industry Trends

1. In thinking about recent and/or new hires at your company or in your industry, what are the skills they are lacking?
2. What is your biggest challenge when hiring new employees?
3. What skills are essential for new hires at your company/in your industry?
4. Have you hired any of our students (coop or recent grads) and if so, what are their strengths and what skills/understandings are they lacking?
5. What should we be doing as teachers to help our students be prepared to be successful at your company and/or in our industry?
6. What other companies in your industry can we partner with to place our students on Coop?

Status Report:

1. See Below

2. See Below
3. See Below
4. See Below
5. See Below
6. See Below

DK: Sustainability, Costs, material selection. Important at college level.
Frank: I think it will be more important as time goes on….now that there is a focus on climate change. "Design for sustainability".
Steve: Not sure about sustainability at the high school level….wants to focus on more tangible skills.
Chris: It is in the state frameworks...but not necessarily in our frameworks.
Frank: At least a student awareness….where does design fit within the company (beginning or end?)
Chris screen shared the frameworks for technical knowledge and skills for engineering.
Frank: Perhaps discuss next time
Steve: How to read specs, requirements, system engineering. The systems piece is important. Use of materials, coding, how to read a document.
Frank: Trying to understand how the requirements work into CAD. Do students have some flexibility regarding what they design?
Chris: There is some freedom for students to choose.
Frank: It is important to follow the document standards and it sounds like that is what you are already doing.
Steve: Perhaps provide them with some design specs but also allow them to specify something they will do on their own.
Frank: Pre-pandemic presentation seemed to come up with different solutions….continue doing what you are doing.
PA: Be sure there is an awareness

Recommendations: Add in curriculum: An awareness of "Sustainability".
Motion: Francisco Brea
2nd Motion: David Kazmer seconded
Vote: Motion Carried

Recommendations: Systems engineering and requirements. Read and write a spec. Continue to do this but be more explicit and be consistent across grade levels.

Motion: Steve Bedrosian
Motion: David Kazmer Seconded
Vote: Motion Carried

Agenda Item #9: Other:
(Please use this section to create and document discussion topics that are specific to your CVTE program)

Status Report: (Record Discussion)

Recommendations:
DK: One of the things I hear from our employers are professional skills….not presentations but being on time, doing what you say you're going to do, etc…..reliability. Professional disposition.
Frank: Managing expectations...communications skills (not going to make or running over a date) - managing expectations. Recent hires...I was looking for communication and meeting commitment. Agile is part of meeting your commitment.

Steve: Are there projects the students work on in teams? That might be something an employer looks favorably on.
Frank: That is commonly discussed during an interview. "What have you done and what challenges did you have?"
Frank: How are team members work together now?
PA: It depends….not everyone works the same just like in industry.
Frank: At the end of a project perhaps each student grades the other students on the team.

Motion: David Kazmer
2nd Motion: Francisco Brea
Vote: Motion Carried

Discussion:
DK: Can you talk about enrollments & support from admin….are you appropriately staffed?
PA: Right now we requested 2 more academic teachers. We currently have 1 core expert for 3 core subjects. Enrollment….has been improving since the beginning of STEAM in terms of numbers and those choosing STEAM.
Steve: We've seen many companies are doing more remote work...what skills are needed. Another skill set that is needed. Perhaps be part of the curriculum.
Dave & Frank agree.
Frank: There is probably going to be a remote component in the future.

ADJOURNMENT at 7:30 PM.
Motion: Steve Bedrosian moved to adjourn
2ND: Dave Kazmer
VOTE: Unanimous

Next Meeting: November 4, 2021
Respectfully Submitted: Michael Darish