2021 ASEE ANNUAL CONFERENCE
Virtual Meeting | July 26–29, 2021 | Pacific Daylight Time
Paper ID #33143

Assessment of Online Professional Development on Faculty Teaching Virtually

Dr. Jamie R. Gurganus, University of Maryland Baltimore County

Dr. Jamie Gurganus is the undergraduate program coordinator and a faculty member in the Mechanical Engineering Department at UMBC, Director for the Center for the innovative, teaching, research and learning and she is the Associate Director of Engineering Education Initiatives at COEIT. Her research is focused on solving problems relating to educating and developing engineers, teachers, and the community at all levels (k12, undergraduate, graduate, post-graduate and faculty development). She seeks to identify best practices and develop assessments methods that assist faculty and teachers with student engagement, helping them to navigate the various pathways in STEM. A few of these key areas include engineering identity and mindsets, first year experiences in engineering, integrating service learning into the engineering classroom, implementing new instructional methodologies, and design optimization using additive manufacturing. Dr. Gurganus collaborates with a number of industry partners and consults throughout Maryland in STEM education initiatives. In 2019, Dr. Gurganus received the Northern Maryland Technology Council Leader Award in STEM education. She has written curricula and published a number of works in engineering education, including a Statics workbook for undergraduate engineering students. She is the Director of Innovation Programs and Operations for the non-profit research collaborative, Advancing Engineering Excellence in P-12 Engineering Education. Dr. Gurganus teaches several first and second year Mechanical Engineering classes along with the Mechanical Engineering Senior Capstone design course for UMBC.

Anita H. Komlodi
Dr. Neha B. Raikar, University of Maryland Baltimore County
Dr. Maria C. Sanchez, University of Maryland Baltimore County

Dr. Maria C. Sanchez is currently serving as the Director of Education and Outreach for the College of Engineering and Information Technology at University of Maryland, Baltimore County. She obtained her B.S. degree from La Universidad de Los Andes in Bogotá, Colombia and her M.S. and Ph. D. in Mechanical Engineering from Virginia Polytechnic University in Blacksburg, Virginia. She has held faculty positions at California State University, Fresno (CSUF), University of Maryland, Baltimore County (UMBC) and University of Maryland, College Park (UMCP). She also served as Project Coordinator of the t-STEM Initiative, funded by the Bill and Melinda Gates Foundation, at UMBC. She is actively engaged in research and program development in the areas of Engineering for Social Change, increasing the accessibility of STEM education to under-represented groups, K-12 outreach, and accreditation activities. Her technical interests are in the areas of Thermodynamics, Heat Transfer, and Energy Systems.

Dr. Charles D. Eggleton, University of Maryland Baltimore County

Dr. Charles Dionisio Eggleton is a Professor in the Department of Mechanical Engineering at the University of Maryland Baltimore County. He has twenty-two years of experience teaching theoretical and laboratory courses in thermo-fluids to undergraduate students and was Department Chair from 2011 - 2017. Dr. Eggleton earned his M.S. and Ph.D. in Aeronautics and Astronautics from Stanford University and his B.S. in Naval Architecture from the University of California.

Dr. Mariajose Castellanos, University of Maryland Baltimore County

Dr. Castellanos is a full-time Senior Lecturer in Chemical, Biochemical and Environmental Engineering at the University of Maryland at Baltimore County. She has taught core and elective courses across the curriculum, from Chemical Engineering Problem Solving and Experimental Design Lab and Thermodynamics to Biochemical Engineering and Process Engineering Economics and Design II (capstone) and graduate courses. Her research interests include metacognition for independent learning and team-based learning, and in-class collaborations between student cohorts in engineering courses.

Prof. Mark Berczynski, University of Maryland Baltimore County
Olivia M. Bailey, University of Maryland Baltimore County

Introduction

In the spring 2020, like many universities, the University of Maryland Baltimore County (UMBC) quickly responded to the pandemic, shifting to a virtual learning environment encouraging the safety of our community. Although several departments had already embraced the online learning environment, many faculty were unfamiliar with the tools and techniques on how to successfully implement an online classroom. Faculty and Staff were pushed beyond their comfort zones quickly adapting to the circumstances, finding themselves and their students distraught and stressed and in need of immediate support from the administration.

Our Division of Information Technology (DoIT), prior to the switch, invested in creating resources for online teaching. However, due to high requests for immediate professional development, they quickly developed a training program "for instructors who wish to take a more deliberate and holistic approach to preparing their courses for remote, synchronous and asynchronous, online instruction [1]." The Planning Instructional Variety for Online Teaching (PIVOT) provided "...evidence-based principles for how people learn and share many of the best practices of teaching in face-to-face classrooms, but leverages those principles and adapts the practices to the online environment [1]."

In the summer 2020, DoIT continued to provide various forms of the training creating PIVOT+. In this professional development, faculty are welcomed to participate either synchronous/asynchronous engaging in ten modules over 10 days. Participants "review content and complete reflection activities asynchronously in a Blackboard course while preparing their course materials for online delivery [1]." Effective practices for using technology, teaching online, and key essential tools are discussed. Additionally, experienced faculty were asked to serve, during the two weeks, as peer mentors.

As a part of PIVOT+, the College of Engineering and Information Technology (COEIT) invested into offering discipline specific professional development. In this workshop series, participants were given the opportunity to engage with peer experienced faculty and undergraduate students in various forms of online learning as it relates to disciplines in the college.

In this evidence based paper, a mix-method approach is utilized to assess the impact of the program on the faculty after the fall 2020. This includes interviews from faculty who participated in the PIVOT+ series and a validated survey instrument that assesses the faculty's attitudes, perceptions, and self-efficacy towards online teaching and learning.

Relevant literature

This pandemic has encouraged faculty to quickly adapt to teaching in the virtual environment. However, due to several significant obstacles, faculty have routinely shied away from transitioning from traditional teaching to online learning. Several factors impact faculty and their hesitancy to adopt teaching online to include online teaching self-efficacy and a space for professional development.

Online Teaching Efficacy and Professional development

Bandura,A. published several influential studies examining the impact of self-efficacy on a person's ability to persist in their career. Self-efficacy refers to "beliefs in one's capabilities to organize and execute the course of action required to produce given attainments [2]." He claims that self-efficacy determines " the courses of action people choose to pursue, how much effort they put forth in given endeavors, how long they will persevere in the face of obstacles and failures…[2]." This understanding applies to all professions including the practice of teaching. Those who exhibited high self-efficacy are likely to persist in their discipline or career despite challenges whereas those whose self-efficacy is low, may struggle to continue. Teaching self efficacy has shown to have a significant and direct influence on student achievement and performance [3],[4],[5],[6],[7],[8]. These factors that impact teaching efficacy, especially online teaching, include lack or insufficient professional development, understanding of student learning, technological efficacy (computer skills and knowledge), instructional strategies, and classroom management [3],[5],[9],[10].

Although there are many facets that impact a teachers self-efficacy as shown above, "evidence indicates the predominant cause of reluctance on the part of educators is due to their insufficient training." Shepherd et al. explained that "... technological change can be hindered by personal anxieties as well as organizational issues [11]." Faculty, especially those who have been teaching in a traditional format for many years, may show "sheer terror to mild indifference and from passive acceptance to overt hostility [11]." Laguna, K. & Babcock, L. demonstrate that anxiety is higher in older adults in comparison to younger adults when it comes to embracing new innovative practices and technologies. In addition to their negative and hesitant perceptions, faculty lack the time to learn and prepare an online class [12]. Faculty need the time and assistance to acclimate to new environments of learning. This will help mitigate significant impacts to their other duties and responsibilities as well as student learning [13], [14], [15]. To provide a comprehensive training "Professional development involves a variety of components. Among other things, it includes the responsiveness to the specific needs of each individual, as well as the continuity of training to reinforce skills [12], [14], [15]."

Model of the Faculty Professional Development

The professional development model was created from a committee of faculty members representing each department in the college. In addition, the facilitator for the PIVOT program through DoIT was invited to serve on the committee. Each faculty member was intentionally chosen for their knowledge and engagement in student engagement, best practices and success in the classroom.

The committee convened routinely in the months of June and July of 2020 strategizing and planning an effective model that would provide optimal training for the faculty. This professional development series included the following;

- Attending two weeks of online instruction and classroom development hosted by the Division of Instructional Technology either synchronously or asynchronously.
- Participate in at least three out of the twelve discipline specific workshops facilitated by faculty and undergraduate students in the college, and
- Submit a recorded lesson where an undergraduate teaching assistant and faculty member could provide feedback.

Faculty who opted to complete the professional development in its entirety earned a $500 stipend from our college.

To provide a comprehensive perspective, experienced undergraduate teaching assistants, known as teaching fellows, from each department were hired to provide an invaluable and authentic perspective for the online classroom. Furthermore, the teaching fellows facilitated student lead workshops and provided invaluable feedback on the participant faculty online lesson videos.

Methodology

To assess the impact of the professional development on the faculty, a mixed-method approach was adopted. This included interviewing faculty who participated in the PIVOT+ series using well-formulated questions and a validated survey instrument that assesses the faculty's attitudes, perceptions, and self-efficacy towards online teaching and learning. This web-based survey, hosted through Qualtrics, was borrowed, with permission, from a previous study that examined online teaching self-efficacy of faculty [10]. Self-efficacy items included instructional strategies, use of computers, classroom management and student engagement. Faculty attitudes and perceptions were also examined measuring satisfaction, perceptions of student learning, future interest in teaching online and their computer skills. Additionally, seven items that motivated faculty to teach online were evaluated. Questions related to the university and the training were added to the questionnaire.

Interview protocol was developed to assess the participants' experience with the online professional development and how it impacted their Fall 2020 semester.

After developing the questionnaire and interview protocol, the Institutional Review Board (IRB) approved the human subject research. Participants who were classified as faculty in COEIT were asked to participate in the survey at the end of the Fall 2020 semester even if they choose not to participate in the professional development program for potential comparative analysis. However, only those who participated in the entire professional development were asked to participate in the interviews post end of the semester.

Participants in the Summer 2020 program, Post- Survey and Interviews.

In the summer 2020, 79 faculty from the College registered and participated in some form of the professional development series. Those who participated, 59% chose to participate

asynchronously whereas 41% chose synchronously. From those who registered, 37% completed the entire series.

Table One presents the demographics for the participants in the survey including gender, unit, rank and how they participated in the professional development series. Table Two shows the demographics of 12 faculty who agreed to participate in the interview. These were individuals who completed the entire PIVOT+ professional development program.

Table 1: Demographic Variables; Survey

Variable	Value	Frequency	Percent
Gender	Male	14	58.3
	Female	10	41.7
Unit	Chemical, Bio-Chemical & Environmental	3	12.5
	Mechanical Engineering	0	0
	Information Systems	8	33.3
	Computer Science & Electrical Engineering	13	54.2
	Engineering & Computing Education Program	0	0
Rank	Adjunct Faculty	6	25
	Assistant Professor	4	16.7
	Associate Professor	4	16.7
	Full Professor	1	4.2
	Lecturer	5	20.8
	Professor of the Practice	2	8.3
PIVOT+	Synchronous	12	52.2
	Asynchronous	8	34.8
	Not at all	3	13.0

**Two units (Engineering & Computing Education Program and Mechanical Engineering) were removed as no response was received*

Table 2: Demographic Variables; Interviews

Variable	Value	Frequency	Percent
Gender	Male	9	75
	Female	3	25
Unit*	Chemical, Bio-Chemical & Environmental	2	17
	Information Systems	5	42
	Computer Science & Electrical Engineering	5	42
Rank	Adjunct Faculty	1	8
	Assistant Professor	5	42

	Associate Professor	1	8
	Full Professor	1	8
	Lecturer	2	17
	Professor of the Practice	2	17
PIVOT participation Type	Synchronous	8	67
	Asynchronous	4	33

**Two units (Engineering & Computing Education Program and Mechanical Engineering) were removed as no response was received*

After the data was collected, items were normalized and then averaged. Item scores were then summed and multiplied by 100 for reporting. Analyses of data included frequency counts, calculations of means and standard deviations, Shapiro-Wilk test of normality, reliability coefficients (Cronbach‘s alpha), One way repeated measures Analysis of Variance (ANOVA), significant difference between groups and variables.

Findings:

A. Survey Findings

Participants who responded to the survey variable motivations to teach online are summarized in Table 3. Thirteen items were assessed asking the participants if each motivation increased or decreased their desire to teach online. Most faculty indicated that they were primarily motivated, at 77%, to teach online due the convenience and flexibility and, at 78%, reaching new student audiences. At the university level, its aim is to provide educational excellence that is inclusive to all students. However, technical support issues and time challenges were the highest variables, at 73% and 71%, decreasing faculties desire to teach online.

Table 3: Motivation or Desire Variables to teach online

Variables	N	Mean	SD	Cronbach Alpha
Convenience/Flexibility*	24	76.64	24.04	0.927
Professional Development Opportunities*	23	70.31	19.60	0.904
Opportunities for Professional Growth*	23	67.24	22.60	0.906
Interest in Reaching New Student Audiences*	23	77.64	24.04	0.902
Job Security, Tenure and Promotion Factors*	23	68.32	26.45	0.862
Material incentives for developing online courses/programs*	23	66.77	25.17	0.722

Peer Support & Collaboration*	23	67.08	27.13	0.982
Reputation of Online Teaching*	23	68.94	24.14	0.798
Policies**	23	61.56	31.17	0.97
Complexity**	23	62.75	22.57	0.848
Technical Support Issues**	23	72.53	27.03	0.878
Time Issues**	21	71.11	29.95	0.926
Quality Issues**	23	57.82	22.73	0.893

Scale: 1= Does not **increase my desire to teach online; 7= **Increases** my desire to teach online*
***Scale: 1=Does not **decrease** my desire to teach online; 7=**Decreases** my desire to teach online*

A one-way Anova analysis with eight levels found no significant differences between the increased motivation items to teach online. However, a significant difference was found, at five levels, between decreasing desire to teach online items, $F(4,80)=3.006$ $p<.005$. Specifically, technical support issues are significantly more impactful to decrease a faculty desire to teach online at 73% compared to quality issues at 58% and complexity challenges at 62%. Additionally, time issues, at 71%, significantly impacts the faculty over quality issues.

Faculties' attitudes and perceptions were assessed and summarized in Table 4. Over half of the respondents, 54%, felt they were 'somewhat satisfied' with teaching online in the fall semester and 'agreed' that their students learned a great deal online. Most of the population felt they had a high level of computer skills prior to teaching online at 88% and if needed, would teach online again at 42%.

Table 4: Attitudinal Variables

Variables	Values	Frequency	Percentage
Computer Skills*	Medium	3	12.5
	High	21	87.5
Satisfaction	Extremely satisfied	4	16.7
	Somewhat satisfied	13	54.2
	Neither satisfied nor dissatisfied	2	8.3
	Somewhat dissatisfied	4	16.7
	Extremely dissatisfied	1	4.2
Future Interest	Yes, I would definitely teach online again	9	37.5
	Yes, if I need to	10	41.7
	No, I would prefer not to	4	16.7
	No, I would definitely not consider teaching online again	1	4.2

Perceptions of Student Learning	Strongly agree	7	29.2
	Agree	13	54.2
	Somewhat agree	3	12.5
	Somewhat disagree	1	4.2

** 'Low' was removed as it was not selected by any the respondents*

Online self-efficacy of both those who participated in the PIVOT+ series and those who indicated that they did not participate in any activity are shown in Table 6 & 7, respectively.

Table 5: Online Teaching Self-Efficacy - participated in PD

Variables	**N**	**Mean**	**SD**	**Cronbach Alpha***
Instructional Strategies	21	78.81	12.44	0.90
Classroom Management	21	79.05	10.97	0.83
Use of Computers	20	81.50	12.73	0.85
Student Engagement	21	72.14	12.92	0.89

**Cronbach alpha was assessed on the entire population of respondents of n= 23.*

A one-way Anova analysis with four levels was performed on the participant faculty self-efficacy variables. A significant difference was found primarily on student engagement and the rest of the variables, $F(3,57)=5.167$, $p<.005$. Faculty are significantly less confident in their abilities to engage with students online at 72% compared to all other efficacy variables. They are most confident in their abilities to handle online teaching technology at 82%.

Table 6: Online Teaching Self-Efficacy - Non-participant faculty

Variables	**N**	**Mean**	**SD**	**Cronbach Alpha***
Instructional Strategies	2	65.00	21.21	0.90
Classroom Management	2	73.75	1.77	0.83
Use of Computers	3	73.33	8.78	0.85
Student Engagement	2	62.50	10.61	0.89

**Cronbach alpha was assessed on the entire population of respondents of n= 23.*

Due to the low response rate of non-participant faculty, a comparative analysis was not performed between the two groups. However, non-participant faculty efficacy variables trended lower compared to those who participated in the professional development. The highest difference, or delta, is shown in participant faculty with greater confidence in their ability to provide and facilitate effective instructional strategies with their students at 79% compared to non-participant faculty at 65%.

B. Interview Findings

Twelve faculty were asked to participate in no more than 20 to 30 minute interviews asking questions regarding their experiences with the professional development and how it impacted their fall 2020 semester. After careful assessment, several themes were identified that were commonly discussed including motivation and participation, best practices either learned or applied, feedback on how the development was useful or how to improve for the further development, and outcomes discovered.

Motivation and Participation

Participants in this study were asked their motivation for attending and engagement with the PIVOT+ program. The responses demonstrated a variety of reasons for attendance, but mainly followed three main themes, to include professional training, program flexibility, and colleague support.

Professional Training

In professional training, four subcategories were identified: new faculty training, learning best practices, tools (training), and wanting more professional development (PD). Five PIVOT+ participants noted that they engaged with this program because they were new faculty members wanting to familiarize themselves with teaching online courses at the university. One participant mentioned that they "had zero idea how the teaching looks like [at] the university" and thought that this was "a great opportunity for [them] to learn" (Participant 12). Another faculty stated that "never done online classes" and was unsure they "could really pull it off" (Participant 4).

Ten participants were motivated to register in the program to learn best practices for online teaching from the facilitators and colleagues. One of the participants noted that "the explaining of how we can do" certain activities from "people who have done this before" was helpful in constructing their "own online teaching" because the "experience [of] sharing the results" showcased what worked and what did not work (Participant 11).

Access to teaching tools and how to utilize them were mentioned as a motivational facet by seven faculty. One mentioned that "there's lots of technologies out there" and "everything can do a lot of everything" which is why learning about and discussing specific tools that facilitators have used was helpful (Participant 4). Further, a faculty member mentioned that it was helpful to "get familiar with tools" and "decide what tools [they could] use" (Participant 2). Finally, in regards to professional training as a motivational item, one of the two participants who specifically mentioned wanting more professional development with the rationale of having the ability "to teach more online classes at UMBC" (Participant 1). This messaging for more

professional development was also demonstrated in the survey where faculty indicated professional development opportunities and opportunities of professional growth were desirable at 70% and 67% respectively

Program Flexibility

The faculty really valued the program flexibility that was offered in PIVOT+. This motivational item focused on the way the PIVOT+ program was delivered and offered to participants. Within the item, sub-items of engagement preferences, mixed facilitation, and mobile Blackboard were commonly mentioned. Convenience/flexibility was found as one of the highest motivational variables, at 77%, in the survey results.

The optional and mixed level of engagement was consistent with many of the faculty's preferences. This was mentioned by two of the interviewees. One participant noted that they appreciated being able "to learn from [both] colleagues and the facilitators" because it provided a broader perspective on the challenges (Participant 5). Another faculty member mentioned that "it was offered both synchronously and asynchronously" which was "very, very helpful" (Participant 1). Similarly, they further valued being able to watch the training from multiple platforms. Two participants explained how they utilized Blackboard (BB) mobile and appreciated that they were able to"do it from a cell phone." This was helpful while they were traveling (Participant 4).

Colleague Support

Colleague support and collaboration was also a valued attribute of the training. In this item, sub-items mentioned included peers talking about the training, supporting other faculty, and supporting the university.

Three participants mentioned that they participated in the PIVOT+ program after a discussion from other colleagues. Specifically, one participant explained that "all of these colleagues [that they] really respect and admire" were involved in PIVOT+ and they knew that if they were "investing their time and effort into an activity like [this]… it's [going to] be worthwhile" (Participant 8). Three participants mentioned that their motivation for participating in this program was to support other faculty members. One participant noted that their "main motivation" was to be able to support faculty members "from the department side" (Participant 7). Participant 7 further explained that they were not scheduled to teach in the fall semester. However they opted to join hoping to lend "more to support [to their] faculty members and understand if [they] could help." Another feature mentioned was in supporting COEIT and the university. It was explained that "college [wide] participation where faculty[representation] from…every discipline was there" was useful to be able to "hear what others think" (Participant 5). Faculty demonstrated through both in the interviews and the survey assessment, with peer support and collaboration at 67%, how engagement and collaboration between their peers incentives their desire to take part in professional development.

Feedback about the program

The feedback on the training program was positive in the interview responses. All the interview participants felt that the training was helpful. The discipline-specific workshops were popular because of their domain-specific relevance to participants' teaching. They felt that techniques and tools that worked well in similar classes were the most practical and actionable knowledge they could gain. Participants also appreciated the opportunity to discuss online teaching challenges in the workshops with colleagues from the same domain. Three faculty emphasized the importance of the community, sharing and discussing lessons learned.

Participants really enjoyed getting an insight into the student experience in online learning. Two important ways were explained in how they served in this role during the course of the training. First, the participants mentioned that they really enjoyed that the two-week course was set up as an actual course on the Learning Management System that was commonly used by the university. The participants found it useful to experience a course from the students' perspective and gained ideas for setting up their own course shell. As Participant 4 described: "I also thought it was great that they had us act as a student in the class, using the technologies. That we then be turning around and using as professors in the class. I thought there was a great way to do that." Second, the participants highlighted the student-run workshops as very important in understanding student needs and challenges for online learning.

Several participants mentioned how well organized the course was. They really enjoyed the ability to see the materials for the whole two-week course and being able to go back and forth. Several participants also mentioned that the availability of resources they could go back to later was very useful.

In addition to the positive comments, suggestions for improvement were also made. Four participants felt that the material was too theoretical and sometimes the concepts were hard to connect to their daily teaching. Others mentioned that the topics covered were too broad, some felt it was overwhelming. Interviewees asked for easier to digest formats, such as Frequently Asked Questions, daily summaries, or resource/pointer documents compiled from the experience of faculty teaching online.

Best Practices for Teaching Online

From the participant interviews, we compiled a list of best practices with the following themes. These were practices that the participants intended to adopt or had already adopted after the PIVOT+ training. Participants also noted that they could apply some of the techniques to face-to-face instruction as well.

- **Universal Design for Learning -** Participants appreciated advice on designing and organizing the content for courses to tailor student needs with accessibility in mind. The program also reinforced the idea of aligning the content modules and assessments with

the learning objectives. Many participants noted that it was illuminating to get a student's perspective by seeing it in action. Participants shared that various instructors using multiple different platforms can be overwhelming for the students. A small fraction of the students have difficulty finding content on the learning management systems. Having a well-designed and organized layout decreases the burden on the student. Several features in the LMS platforms, like discussion boards, were underutilized.

- **Active Learning and Student Engagement** - A lot of the faculty use active learning in their classes. A significant struggle with the online transition was translating the active learning practices into the online setting to make the learning more interactive and, as quoted, "lively." Participants used various techniques they learned from the program, like synchronous polling, breakout rooms, discussion forums. Many participants also used external platforms like Slack, Piazza, etc., to continue asynchronous student engagement. Participants noted that the approach used depended on the type of interaction they wanted; student-student (group work), student-instructor (polling), or student-content (quizzes) interaction. One participant mentioned the use of course analytics to keep track of student engagement. Another participant noted that only 10-20% of students participate, and they wanted tools to continue the engagement throughout the semester, not just before exams. One participant replaced the examinations with projects. The reasoning behind this was that students learn more by actively doing stuff.
- **Synchronous vs. Asynchronous** - The participants used synchronous, asynchronous, or a hybrid approach to deliver their classes. The asynchronous mode had more flexibility to accommodate schedule, connectivity issues, or time zone differences. The synchronous mode was better for student engagement. Participants noted doing a combination, for instance, recording videos while traveling, 1 live and 1 pre-recorded video per week, etc.
- **Tools** - Several participants indicated that the PIVOT+ program increased their familiarity with the learning management system and with various tools. The PIVOT+ program provided the participant opportunities to learn from others' experiences. One participant mentioned, "each tool may take 1 - 2 months [to learn]," which the PIVOT+ program was able to cut short. Some of the tools mentioned in the interviews were, VoiceThread or Panopto for content delivery, WebEx Teams or breakout rooms or group work, Piazza or Slack for student engagement, discussion forums, SafeAssign for plagiarism detection, and so on.

Training Impact

All interviewees mentioned that they have either implemented changes in their courses already or are planning to implement changes. These changes were in many different areas, from the organization/blueprint of the course, through student engagement and active learning, to assessments. Participants also felt that the accumulated resources they had access to in the course will be useful for them during the academic year. Several participants mentioned that they were interested in using the resources in the future to look up best practices and other materials.

Conclusion & Future Work

Through the last year, universities and colleges have truly come together as a community, supporting each other in what has been a challenging unrelenting time. However, through these unprecedented circumstances, a space of assessing new teaching practices and techniques has been created. This has allowed faculty to enrich their knowledge and progress students' learning.

As demonstrated in this research study, faculty online teaching self- efficacy, attitudes and perceptions and motivations are positively impacted by a professional development that engages a community of peers, students and the university. Although hesitation and anxiety may have prevented previous engagement with the online environment, providing safe, non-judgemental spaces like PIVOT+ program gives faculty an opportunity to develop and learn new teaching techniques.

From this study, various outcomes were uncovered that will be used to inform future professional development for online teaching. The predominate contributions from this evaluation include:

- Primary motivations for faculty to be professionally developed and teach online are the convenience & flexibility, professional development opportunities and ability to collaborate and converse with their peers.
- Including disciplinary and student centered and facilitated workshops provide a rich experience for faculty.
- More seminars and workshops are needed around student engagement in the online classroom.

References

[1] Division of Information Technology. “ The Planning Instructional Variety for Online Teaching.” Accessed on: Feb. 28, 2021 [Online]. Available https://pivot.umbc.edu/

[2] Bandura, A. 1986. Social foundations of thought and action: a social cognitive theory. NJ:Englewood Cliffs: Prentice-Hall.

[3] Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. Teaching and Teacher Education, 17, 783–805.

[4] Tschannen-Moran, M., Hoy, A. W., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. Review of Educational Research, 68, 202–248.

[5] Yoon Yoon, So, Miles G. Evans, and Johannes Strobel. "Validation of the teaching engineering self‐efficacy scale for K‐12 teachers: A structural equation modeling approach." Journal of Engineering Education 103.3 (2014): 463-485.

[6] Coladarci, Theodore. "Teachers' sense of efficacy and commitment to teaching." The Journal of experimental education 60.4 (1992): 323-337.

[7] Gibson, Sherri, and Myron H. Dembo. "Teacher efficacy: A construct validation." Journal of educational psychology 76.4 (1984): 569.

[8] Muijs, Daniel, and David Reynolds. "Teachers' beliefs and behaviors: What really matters?." The Journal of Classroom Interaction (2002): 3-15.

[9] Robinia, Kristi A., and Mary L. Anderson. "Online teaching efficacy of nurse faculty." Journal of Professional Nursing 26.3 (2010): 168-175.

[10] Horvitz, Brian S., et al. "Examination of faculty self-efficacy related to online teaching." Innovative Higher Education 40.4 (2015): 305-316.

[11] Shepherd, Carol, Madelon Alpert, and Marilyn Koeller. "Increasing the efficacy of educators teaching online." International Journal of Social Sciences 2.3 (2007): 172-78.

[12] Laguna, K. & Babcock, L., “Computer anxiety in young and older adults: Implications for human-computer interactions in older populations,” Computers in Human Behavior, vol. 13, pp. 317-326, 1997.

[13] Stanley, Laura D. "Beyond access: Psychosocial barriers to computer literacy special issue: ICTs and community networking." The Information Society 19.5 (2003): 407-416.

[14] Saunders, Danny, and Derek Hamilton. "A twinning model for staff development in higher education." Innovations in Education and Training International 36.2 (1999): 118-127.

[15] Schar, A., “Development of a program to support faculty in the creation of online classes at Saddleback College,” Ed.D. dissertation, Dept. Education, Nova Southeastern Univ., 2002. [ERIC Document Reproduction Service No. ED474591].