Faculty Development and Community of Practices: Exploring their Interplay to Facilitate Change in Pedagogical Practices at HEI's

Rohit Kandakatla, Anurag Palla

Abstract—The last decade has seen numerous calls from academicians, government agencies, and policy agents to facilitate change in instructional practices in higher education. The calls have encouraged numerous institutions to organize faculty development programs to build the knowledge and skills among faculty and promote large-scale reforms in STEM instruction. Despite many years of efforts by faculty developers and institutions, traditional teaching methods continue to dominate as the primary mode of STEM instruction. In this study, we explore the role of a Community of Practice (CoP) in achieving sustainable change in instructional practices after the completion of the faculty development program in India. A CoP was formed before the start of a 6-week faculty development program on technology-enhanced learning to encourage and build a sense of community among the participants. Qualitative data was collected during the 6-week program to analyze the different ways in which the CoP supported the participants to achieve the outcomes of the faculty development program. Results from the thematic data analysis revealed that the members of the CoP helped each other through the exchange of ideas, clarification of misconceptions, providing feedback, and exchange of knowledge. It was observed that participants with varied prior teaching experience supported each other as they designed and developed course websites (developing tacit knowledge). After the completion of the 6-week program, the participants continued to meet with other members of the CoP to share the experience of how they adopted technology-enhanced learning in their respective courses. The members of the CoP started to exhibit a commitment to the shared vision of technology-enhanced learning. This led to the transformation of the CoP members from participants of a workshop to change agents themselves as they started to conduct additional training programs for the other faculty in the institution.

Keywords— Faculty Development, Reflective Practice, Community of Practice, Organizational Change, Higher Education.

I. INTRODUCTION

There There have been consistent efforts taken up in the last two decades by education researchers, practitioners, professional organizations, and policy makers to bring about change in higher education institutions (HEI's). One of the focus areas which has been always at the forefront of these conversations to promote change is STEM instructional practices [1]. The efforts taken up have led to many conversations among change agents to understand the process of how to promote and sustain change in STEM HEI's. A literature review of faculty development research focusing on change strategies revealed the various type of programs such as seminars, workshops, short courses, interventions by external consultants, mentoring programs, and action research [2]. Faculty developers have adopted many of these strategies as part of their professional development programs to promote change especially in STEM instructional practices [3]. However, most strategies used in faculty development programs do not end up sustaining the change process post-completion of the programs as it takes a long time for faculty to change their attitudes and behaviors [4]. This has resulted in modest success with respect to change in instructional practices at STEM HEI's [5].

Most faculty development programs are organized for a short duration in the form of seminars, workshops, and short courses mainly due to organizational, logistical, and financial constraints. For meaningful impact, faculty development programs should be designed and facilitated for a longer duration of time usually varying from 4-weeks to a semester and longer [6]. The longer duration of programs is however hard to achieve through external interventions and support. Even though the successful organization of longer programs would lead to measurable impact and change, such models would not be scalable. The constraints of scalability would limit the extent of the dissemination of the change strategies and practices and would therefore lead to criticism on the sustainability of the change across the institution.

In this paper, we explore the role of Community of Practices (CoPs) to sustain change efforts driven through faculty development programs. We investigate how the formation of a CoP before the start of faculty development efforts has led to the dissemination of the change efforts post the completion of the program. The study was conducted at BLINDINST, a private engineering-focused institution in the south of India where a group of seven engineering faculties underwent a 6-week intensive faculty development program on Technology-enhanced learning. We investigate through a qualitative case

R. Kandakatla is with KG Reddy College of Engineering and Technology, Hyderabad, TS, 500096, India (e-mail: rohit.kandakatla@kgr.ac.in).

A. Palla is with Anurag University, Hyderabad, Telangana, India 500088 (e-mail: apalla@anurag.edu.in)

study, the process of how a CoP formed at the start of the faculty development program sustained the change efforts and established its identity through the program. The CoP later emerged as a full-fledged center to promote and implement evidence-based practices into undergraduate engineering instruction. The study aimed to highlight the process and transition of ownership of change efforts from the facilitator to the core group members of CoP who later championed the change efforts across the institution.

II. LITERATURE REVIEW

In this section, we review the literature on successful strategies to facilitate change in higher education and present prior research that discuss CoPs and faculty development. We highlight how the results from the study contribute to the literature on faculty development and change in higher education.

A. Facilitating Change in Higher Education

There has been plenty of research reported in the faculty development community about the motivation and the process of how change efforts were initiated, implemented, and sustained [7]. An analytic literature review of change strategies revealed that most of the prior work could be mapped to four categories as described in Figure 1 [8]. In the first category, the change strategies involved faculty development programs prescribed by external change agents. This approach aimed to impact change at an individual level through the dissemination of evidence-based instructional practices. The second category was also focused on individual change but was emergent in nature. Here, the change strategies were not prescribed by the change agent and emerged internally by encouraging the faculty to become "Reflective Teachers". The third strategy "Enacting Policy" shifts its focus from individuals to environments and structures. Change strategies in this category focused on fostering the appropriate environments through prescribed

policy. Examples include rules, reporting requirements, reward systems, etc. The last strategy while also focused on environments and structures is to develop a "Shared Vision" among all stakeholders in the institution. The change agent in this role is responsible to spark discussions and empower individuals to come together and collaborate towards the envisioned change. The Shared Vision strategy aligns with building a community of individuals who aspire towards a common goal. Strategies that are emergent in nature (two and four) were observed to be sustainable as each individual gets to have a voice in the change process.

B. Community of Practice (CoP)

A CoP is formed by a group of individuals who share a common concern and passion towards a particular area and collectively focus and work towards a common goal. A CoP is often identified through three distinctive characteristics: 1. Domain – a shared value or purpose identified by the members of the CoP, 2. Community – buy-in from a group of people who have agreed to work towards the domain through engagement in joint activities, and 3. Practice – a selected list of initiatives, resources, and tools that the members share as part of their membership in the CoP [1]. CoPs when established can take on multiple forms in terms of their domain, location, and focus area. CoPs can exist in one organization or could be distributed across local, national, and international demographic locations. The domain of interest could be either homogenous or heterogeneous depending on the interests of the CoP members. CoPs could also be formed informally or through formally recognized structures depending on the domain and activities agreed upon by the members. The main goal of the CoP members is to advance the selected domain. In spite of all the flexibility, most research has reported CoPs to be formed and emerged out of individual organizations with the members already working with each other [2].

Individuals	**I. Disseminating: CURRICULUM & PEDAGOGY** Change Process: Tell/Teach individuals about new teaching conceptions and/or practices and encourage their use. Examples: dissemination/training (SER, FDR), focused conceptual change (FDR)	**II. Developing: REFLECTIVE TEACHERS** Change Process: Encourage/Support individuals to develop new teaching conceptions and/or practices. Examples: reflective practice (FDR), curriculum development (SER), action research (FDR, SER)
Environments and Structures	**III. Enacting: POLICY** Change Process: Prescribe new environmental features that Require/Encourage new teaching conceptions and/or practices. Examples: policy change (HER), strategic planning (HER)	**IV. Developing: SHARED VISION** Change Process: Empower/Support stakeholders to collectively develop new environmental features that encourage new teaching conceptions and/or practices. Examples: institutional transformation (HER), learning organizations (HER)
	Prescribed	*Emergent*

Aspect of System to be Changed (vertical axis label)

Intended Outcome

Fig. 1. Four categories of change strategies [8].

C. Faculty Development and Community of Practices

The organization of faculty development programs among participants who are part of CoPs have reported multiple benefits. Individuals who are part of the CoP would get diverse perspectives on the topic of interest when they collaborate and engage in group work [11]. Members of a CoP were observed to proactively contribute to the activities and discussion as their membership indicated the shared interests of the group. Carter in their work suggested that individuals in a CoP can be assigned to a critical friend whose role would be to probe questions and help the individual gain new insights about the topic [12]. This would be particularly beneficial to individuals who might have trouble reflecting and might need the probing question to think critically. CoPs formed within the same organization have been reported to catalyze and facilitate informal discussions among participants outside of the faculty development sessions and help sustain interest in the area of focus [13]. Large-scale professional development efforts have explored the formation of virtual CoPs to expand and sustain the change efforts [14]. While all these studies report the benefits of CoP during faculty development efforts, the goal of this study was to understand the process and potential factors that resulted in the sustenance and scale of the change efforts. A CoP was mutually agreed upon and formed prior to the start of the 6-week faculty development program on Technology-enhanced learning and we explore how the CoP has impacted the extent and quality of discussions, support received and provided, and the fostering of community among the participants of the program. Results from this study could be translated to any higher education institution where the leadership is motivated to transform the pedagogical practices throughout their institution.

III. METHODS

A. Context of Study

In this study, we explore the role played by a CoP that was formed prior to the start of a 6-week faculty development program. The faculty development program was conducted for seven faculty from BLINDINST in India and the focus of the program was the design and development of technology-enhanced courses. The institution's head had reached out to the faculty developer on their intention to introduce educational technology tools to teach their undergraduate engineering courses and invited them to facilitate a faculty development program. The participants for the program were selected based on their interest shown to adopt technology tools in their instructional practice. The head of the institution had given an open invitation to all the faculty interested to attend the program and the faculty who volunteered to participate were included in the program. During the program, all the participants re-designed a course of their choice to integrate it with various educational technology tools. Instead of merely picking a technology tool and using it to drive the course design, the participants were made to reflect and understand how the technology tools can be constructively aligned to the course content and pedagogy.

The faculty developer proposed the formation of the CoP to build a sense of community among the participants so that they could collaborate and support their peers throughout the duration of the 6-week program. The participants based on the initial discussions had all agreed to make "integration of technology tools in undergraduate engineering courses" the domain of interest for the CoP. The domain of interest was selected based on the mutual interest among the participants as all of them had decided to take part in the faculty development program to adopt technology-enhanced learning to their instructional practices. All the participants agreed to follow a set of shared norms that required them to support each other in the process of facilitating change in instruction through technology tools. They agreed to actively engage and collaboratively work on activities that were organized during faculty development sessions. The CoP members agreed on the 6-week faculty development program to be the first practice that would help them evolve in the domain of interest. A consensus on other additional practices of the CoP was expected to be made after the end of the 6-week program.

B. Research Questions and Methodology

We attempt in this study to understand the interplay between the process, outcome, and change facilitated through the faculty development program as a result of the formation and development of a Community of Practice. We address the following research questions:

1. How do participants describe their experience of being part of a Community of Practice during the faculty development program?
2. What was the nature of interactions among the members of the Community of Practice during the faculty development program?
3. How does the formation of the Community of Practice influence instructional change in a STEM undergraduate institution?

We used qualitative case-study as the methodology to drive the research design of the study as we intended to understand the experiences of the participants [15]. The case in this study was the 6-week faculty development program, as the goal was to examine the phenomenon of how the membership in a CoP would influence the experiences of faculty during and after the completion of the program. The unit of analysis was the individual experiences of each of the participants during the duration of the program.

C. Data Collection

Seven participants who attended the faculty development program took part in the study. We used convenience sampling to select the participants as the faculty who expressed interest to adopt educational technology tools were part of the program. The overview of the participants in terms of the discipline of engineering and years of teaching experience is mentioned below in Table 1.

TABLE I.

OVERVIEW OF SAMPLE

Participant	Discipline of Engineering	Years of Teaching Experience
Participant 1	Civil Engineering	No prior experience
Participant 2	Electronics Engineering	2 years
Participant 3	Mechanical Engineering	6 years
Participant 4	Computer Science Engineering	10 years
Participant 5	Electronics Engineering	9 years
Participant 6	Electrical Engineering	10 years
Participant 7	Computer Science Engineering	15 years

We collected multiple sources of data to examine the experiences of the participants during the faculty development program. During the 6-week program, each of the participants was individually interviewed at the end of every two weeks (week 2, 4, and 6) using a semi-structured interview protocol. The semi-structured interview protocol was designed to probe different facets of the participants' experience every two weeks. One round of cognitive interviews, a process used to evaluate the potential participants' comprehension of the language used in the interview protocol, was first conducted prior to the start (week 0) of the 6-week program. Cognitive interviews were conducted with other engineering faculty from the same institution to test the language of the semi-structured interview protocol. The cognitive interviews helped us assess the respondents' understanding of the questionnaire and the feedback provided was used to improve the design and language of the final instruments [16].
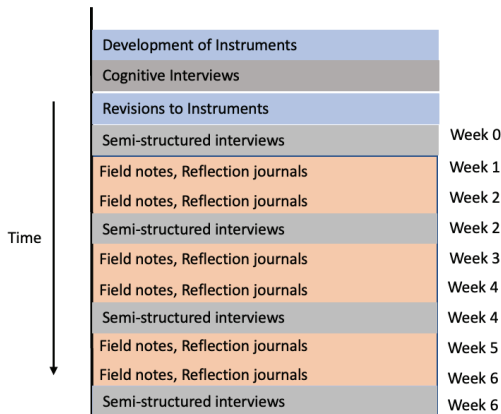

Fig. 2. Data collection process and timeline

Another source of data was collected by the researchers in the form of field notes during the faculty development program. Field notes were taken every day throughout most of the sessions in the 6-week program as the participants interacted with each other, shared their queries, worked on various activities, and completed their final design project. We made a note of observations that would potentially be important and useful to answer the research questions being addressed in the study. Participants were also asked to maintain a reflection journal throughout the 6-weeks of the program. They were provided with prompts to reflect at the end of each day of the program and were asked to answer those questions in their reflection journal. The overall timeline of the data collection process is shown in Fig 2.

D. Data Analysis, Validity, and Reliability

A thematic analysis approach was employed to analyze the data and the six-phase approach as suggested by Braun and Clarke was used to systematically analyze the data in multiple steps [17]. The process began with first familiarizing ourselves with the data followed by generating initial codes, searching for themes, reviewing themes, defining and naming themes, and then producing the final report at the end. Tracy's eight "Big-Tent" criteria for excellent qualitative research were utilized to showcase the rigor and the quality of the study [18]. The "Big-Tent" criteria recommend eight measures of quality for qualitative research – worthy topic, rich rigor, sincerity, credibility, resonance, significant contribution, ethics, and meaningful coherence. The validity of the findings was verified by using thick descriptions, triangulation, and member reflections. We detailed the themes that emerged from the data by providing quotes from the participants' interviews and reflections. The findings were triangulated using two approaches – 1. Intercoder reliability checks on the codebook; 2. Triangulation of findings with semi-structured interviews, field notes, and reflection journals. After the recording and transcription of the data, member checking was conducted with all the participants as they were asked to report any discrepancies in the transcribed data. The same was also carried out with the participants after data analysis to ensure that the findings provide a true interpretation of their experiences during the 6- week faculty development program.

IV. RESULTS

We present the results of the thematic analysis through themes and sub-themes and each of the themes was focused on a specific facet of the participants' experience during the 6-week program. Illustrative quotes from the participants are mentioned for each theme to give additional context to the discussion. The quotes were picked from a list of data excerpts that were coded under each theme and sub-theme as part of the thematic data analysis process.

A. Theme 1 - Community of Practice Encouraged Sharing of Knowledge and Resources among the Participants

During the faculty development program, the participants were observed to regularly engage with each other for varied reasons. While some of the engagement was structured by the facilitator, participants also engaged with each other outside the faculty development sessions. This was attributed to the feeling of community that has started to foster among the participants, as they now (also as members of the CoP) collectively worked towards their agreed domain of interest.

Sub-theme 1.1 - Exchange of pedagogical knowledge among faculty with varied prior teaching experience

We observed participants with varied prior teaching experience actively engage in discussions to share their knowledge and resources. Participants who were new to teaching received support from experienced teachers about the various pedagogical techniques they could implement in their course: *"I wasn't aware of techniques such as flipped*

classroom where students will first review the content at home, and I could spend the classroom time to clarify their questions. I came to know about such approaches when I spoke to my peers, especially the ones who implemented such techniques before." The exchange of knowledge was observed to be reciprocal in nature where the younger teachers also contributed to the conversations and shared their perspectives of being recent students themselves. *"Through the community of practice, I was able to get good inputs from the faculty with lesser teaching experience. Because experienced faculty will always be using the same approaches [pedagogic techniques] they used previously and might limit it to that. But the less experienced faculty would not have such limitations. They are more willing to explore as many tools and methodologies as possible. Less experienced faculty are also closer to their own experience as students, so they are in a better position to understand what is best for the students, as compared to an experienced faculty like me who has not been a student for more than 10 years. So, the mixture of having instructors with diverse teaching experience was helpful to my learning."*

Sub-theme 1.2 - Exchange of technological knowledge among faculty from different engineering disciplines

Participants reported taking each other's assistance while learning about how to make use of different educational technology tools. For instance, one of the challenges that the participants encountered during the program was when they had to explore and evaluate which technology tool to adopt. Participants with low technology-self efficacy were observed to be hesitant while exploring and integrating technology tools into their courses. They encountered troubleshooting errors while utilizing the technology tools and sought help from their peers: *"I started first by creating a blog. Then I tried using the Wix platform and found that I cannot share videos through Wix. Then I tried platforms such as Adobe, Edmodo but I found it difficult. It is not user-friendly. I asked and got help from my peers who used these tools, and I was slowly able to get comfortable with using them".* Members of the CoP who were teaching courses in the computer science and engineering departments were observed to have high technology self-efficacy due to their past experience of using the tools and supported the other participants.

B. Theme 2 –Development of Tacit Knowledge Through the Peer Support Offered by the Community of Practice

In this theme, we presented how the participants with varied prior teaching experiences supported each other in the development of tacit knowledge and deeper learning skills such as engaging in reflection, critical thinking, and metacognition. All of these skills were essential for the participants to successfully complete the faculty development program and technologically enhance their courses.

Sub-theme 2.1 – Collaborating with CoP members for critical feedback

The participants during the faculty development program were constantly encouraged to critically think about their prior offering of the course. They were asked to use that information to ensure their decisions on the new course design were student-centric. For example, participants during weeks 2 and 3 had to identify the pedagogical and technological tools for their course by critically thinking about the past offering of the course. This would help them identify the challenges students faced and later identify tools that would help overcome them. Participants mentioned working together to provide constructive and critical feedback to each other: *"When I was identifying the pedagogy and technology tools, my peers gave me critical and constructive feedback about my choices, and this helped me improve my project."* We observed that the quantity and quality of the feedback increased throughout the program as participants started to feel more comfortable with other members of the CoP. This allowed them to build a culture where they could provide and receive feedback constructively, as they all were now committed towards a common shared interest.

Sub-theme 2.2 – Novice teachers were unaware of reflective practice and received support from other participants

Participants in their interviews mentioned that they often reflected on their prior teaching experience as they were redesigning the course by using technology tools. When they wanted to take the learners into consideration, they often resorted to their prior experience with teaching the course: *"While working on the final project, I was aware of students' attitudes and motivation in the class. I was also aware of the students who are slow learners [lower performing students] and advanced learners [higher performing students]. Through my past experience, I have learned to use different teaching strategies to teach different students. For slow learners, I need to provide a detailed explanation and then give them many opportunities to practice".* Participants who were new to teaching were unaware of the practice of reflection and were therefore unable to engage in this task. They could not critically reflect on their prior teaching experience: *"During the activities, I have been asked to reflect a lot on how I am teaching and why I am teaching in a specific way. This has been challenging because I don't have a lot of practice or experience with reflection. The idea of reflection was very new to me. Now that I am trying to do that, it has been a little challenging."* Participants who were novice teachers held discussions with an experienced teacher to prompt them with critical questions that would help them to reflect. The participants, however, got better with reflective practice as they progressed through the 6-week program and the novice faculty resorted to their experiences as a student while they engaged in reflection. Reflective practice is considered to be tacit knowledge and requires constant practice from the teachers to develop the ability to critically investigate their prior teaching practices.

Sub-theme 2.3 – Participants collaborated to build metacognition skills

By end of week 6 of the faculty development program, many of the participants neared the completion of their final design project. During this process, the participants were required to analyze, evaluate, and redesign their courses in technology-

enhanced learning environments. They had to develop a meta-conceptual awareness of how to intersect the knowledge of content, pedagogy, and technology to address some of the limitations they encountered as an instructor and the learning needs of students [19]. This was a challenge for a few of the participants as they seemed to lack the ability to think metacognitively: *"The first challenge was deciding about the final project. I wasn't able to think in a way to bring all aspects of the concept map together. When I spoke to [Participant 6], he showed me all the websites that are available and could support interaction between instructor and peers. I then narrowed it down on the platform which I thought was most user-friendly."* Participants while completing the final design project often met outside of the training program: *"I was meeting with other participants whenever I was working on the final project. Not only when we met for the sessions every week, but we also interacted when we needed help. I was discussing with [Participant 2] what should be our final project. Sometimes we disagreed but it was a good discussion. Everyone in the group was involved to integrate technology and this reflected on our final projects."* The development of metacognitive awareness required the participants to constantly reflect, deliberate, and ask themselves questions that would enable them to think about how students learn in their course. The facilitator also introduced the participants to specific tools that allow them to engage in mind mapping which would support them in the process. The regular discussions among the members of the CoP held over the last 3 weeks helped them to conceptualize and complete their final design project.

All of the skills mentioned in this theme – reflection, critical thinking, and metacognition are considered tacit knowledge and deeper learning skills which cannot be easily taught to the participants [20]. The participants reported benefiting from the diversity (in terms of prior teaching experience) among the community of practice members as they could help each other build the tacit knowledge while working on their final design project. Without access to a supporting community, the facilitators are usually expected to help the participants build these skills by themselves. However, tacit skills are usually hard to teach and often can be built through an apprenticeship model [21], which takes long a duration of time. The members of the CoP indirectly supported the change efforts of the facilitator by helping each other to finish the final project. The development of these skills among the participants was evident through the quality of the final projects as most of them exceeded the expectations from the program.

V. DISCUSSION

Before the start of the faculty development program, a CoP was formed among the participants who agreed to focus on a common domain of interest i.e., integrating technology into undergraduate engineering courses. The 6-week program was organized as one of the first practices of the CoP that would help the members build knowledge and expertise in the domain of interest. During the faculty development sessions, the participants were provided with multiple opportunities to interact with the other members of the CoP and collaboratively work on specific activities that were aligned to help them complete their final design project. The CoP members were observed to help each other during the generation of ideas, clarifying misconceptions, and providing feedback to each other. Participants with higher prior teaching experience also mutually benefited from the interaction with their peers as they got feedback on the design choices for the final project. Participants utilized their peers to receive constructive feedback as the CoP members helped them to ask critical questions while engaging in discussions and group activities. In this section, we discuss how the practices adopted in the 6-week program and the formation of CoP have contributed to the sustainability of the change efforts in the institution after the faculty development program.

A. Use of Reflective Practice to Transfer Ownership of Change Efforts

Most capacity-building efforts often involve an individual change agent (i.e., the faculty developer) who prescribe their knowledge and understanding of best practices which they hope the participants of the program will adopt. However, in such an approach, the adoption of the prescribed best practices cannot be guaranteed and is dependent on the individual motivation of the faculty. For example, one of the commonly reported barriers reported in the literature is the existing beliefs of the faculty participants about teaching and learning [8]. The 6-week faculty development program mentioned in the study coupled the prescribed capacity-building efforts with multiple opportunities for the participants to reflect and develop their own understanding on how to best integrate technology tools into their courses. In theme 2, the participants mentioned their experiences which required them to engage in critical thinking, reflection, and metacognition to complete their final design projects. All these practices were intentionally structured and included in the 6-week program to provide them with multiple opportunities to engage in reflective practice. Prior studies report the use of reflective practice as a tool to make faculty investigate more deeply the underlying values and assumptions that constitute their philosophical orientations to teaching and learning [22]. Effective change strategies must aim to help faculty change their conceptions of teaching and learning [23] as it has a direct correlation with the approaches to teaching [24]. Faculty developer's inclusion of reflective practice in their programs could therefore build in intrinsic motivation and as a result buy-in among the participants to adopt the best practices and further advocate for them as change agents in their classroom and institution.

B. Role of CoP to build Shared Vision

Participants in most faculty development programs are mainly focused to complete all the tasks by themselves with minimal collaboration with others unless they were structured opportunities or requirements introduced by the facilitator. The CoP was recommended to be formed prior to the start of the program to encourage the participants to collaborate and support others by agreeing to a common domain of interest. Participants' quotes in theme 1 highlighted the exchange of knowledge and resources among each other as they all

collectively supported each other to complete their final design projects. Conversations with the participants after the completion of the course revealed a sense of community starting to foster among the participants as all of them indicated to meet after the program to share their experiences of implementing technology-enhanced courses. The inclusion of opportunities to engage in reflective practice led the participants to change their beliefs and conceptions, as they reported to appreciate the benefits of integrating technology tools into their courses. We believe these experiences along with the mutual agreement on the domain of the CoP increased their level of commitment to technology-enhanced learning beyond their respective courses. A follow-up conversation a few months after the program revealed that the CoP members, after the end of the 6-week faculty development program, have included new additional practices that would help them to continue building expertise in technology-enhanced learning [25]. The CoP members had later organized a 1-day workshop which was facilitated by them to share their experiences of designing and teaching undergraduate courses through technology-enhanced learning. The 1-day workshop was organized to motivate and generate interest among other faculty in the institution to join and become members of the community. The CoP was observed to sustain even after a year of completion of the faculty development program as the community grew from 7 core members to a group of 18 faculty from the institution. Coincidently, when the Indian government announced a lockdown due to the COVID19 pandemic, the CoP members led large-scale faculty development efforts to train and prepare all faculty in the institution to transition and teach their courses in an online mode [26]. The efforts taken up by the CoP during disruptions caused by the pandemic were widely appreciated by the institution who later agreed to evolve the CoP to a Center of Educational Technology (CET). CET was established to support the CoP with additional resources which would enable all faculty to technologically enhance their learning during and post the pandemic. The faculty developer was therefore able to transform the faculty participants into change agents and guide them to develop a shared vision, which led to design and organization of new practices aligned to that vision.

C. Implications and Limitations of the Study

The study provides faculty developers with some directions and recommendations to sustain the change efforts led by them as change agents. Most faculty developers are provided with limited time to facilitate their professional development programs and therefore are unable to ensure meaningful changes in the participants' instructional practices. We, therefore, recommend faculty developers to use a combination of change strategies as shown in Fig. 3, which could help transform their participants into change agents and empower them to lead the change efforts after completion of the faculty development program. In the first stage, the focus is on the individuals where the change strategies are prescribed in nature. Such strategies utilize a one-way mode of communication where information is shared from the faculty developer to the participant. In the second stage, the focus is once again on the individual but the nature of the strategy changes to being

emergent. In this stage, the faculty developer is merely a facilitator and has provided structured opportunities to the participants to reflect and build their own conceptions about the benefits of the prescribed best practices. The reflective practice experiences resulted in the transformation of the participants into change agents as their new beliefs led them to also champion and advocate for the best practices. In the last stage, the focus shifts from individuals to the whole group as the CoP empowers all participants to develop a shared vision based on their renewed understanding of the domain of interest. Formation of the CoP prior to the start of the program will encourage and increase peer collaboration among the participants which would be critical to the fostering of a sense of community among the participants. The combination of these strategies could help faculty developers and institutions to build internal capacity among faculty and ensure the dissemination of the best practices across the institution.
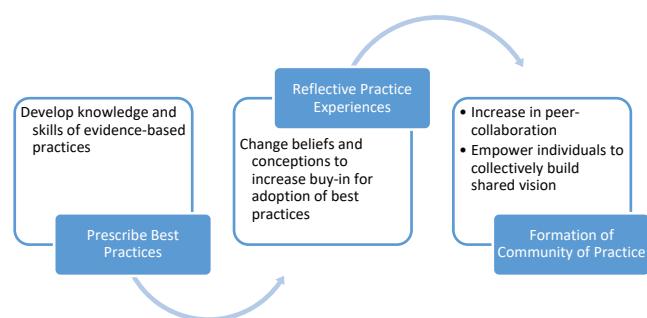

Fig. 3. Recommended combination of strategies to sustain change efforts

One of the limitations of the study is the possibility of the potential bias that might have occurred during the data collection process. As mentioned in the data collection section, the faculty developer also collected field notes during the 6-week program. Although the faculty developer tried to be transparent with his data collection process, we cannot completely refute the possibility of any bias in the field notes. Another limitation is the support provided by the institution to the CoP from its inception. As we highlighted the role of CoP and reflective practice in sustaining the change efforts after the 6-week program, it is also important to note that the support from the institution's leadership was essential to the growth of the CoP. The institution was fully committed throughout the process to empower its faculty and transform their instructional practices through educational technology tools. The establishment of CET was also motivated by the shift to online learning during the COVID19 pandemic. The recommendations from this study would therefore only hold true through the support from the institution's leadership.

VI. Conclusion

The study attempted to understand the interplay between faculty development programs and community of practices and how they can contribute to sustainainable change in higher education institutions. A Community of Practice was formed prior to the start of a six-week faculty development program to

help participants adopt technology-enhanced learning into their teaching practices. The paper reported that the sustainability of the change efforts resulted from the fostering of a sense of community among the participants. Most faculty development programs are prescribed in nature, where the change agents promote evidence-based instructional practices among the participants. The participants mostly end up not having a voice in the change process through this approach and therefore limit their new knowledge and skills to themselves and their classrooms. We observed that the formation of the CoP facilitated discussions that helped the members mutually agree upon a shared vision. The intentional introduction of reflection practice opportunities during the 6-week program helped the participants to reflect and build their own conceptions of the importance of technology-enhanced learning. The change in beliefs impacted participants' acceptance of technology in teaching which was also evident through their growing commitment to the shared vision of the CoP. The shared vision and the feeling of community encouraged them to introduce new practices as part of the CoP and invite more members to be part of the community. The development of reflective teachers and the shared vision, both emergent change strategies, contributed to the long-term sustainability of the change efforts. It is therefore important to utilize a combination of prescribed and emergent change strategies to be able to transform the participants as change agents after the completion of faculty development efforts.

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Rohit Kandakatla is currently serving as the Director for Strategy, Operations, and Human Resource Development at KG Reddy College of Engineering and Technology. He also has an adjunct faculty appointment with the Center for Engineering Education Research at KLE Technological University.

He has completed his Ph.D. in Engineering Education from Purdue University, Bachelor of Engineering in Electronics and Communication from Manipal Institute of Technology, and Masters in Embedded Systems from Jawaharlal Nehru Technological University. His research interests include faculty use of educational technology, community-based learning, faculty development, understanding organizational development in higher education, and integration of technology and entrepreneurship in engineering education.

He was awarded Young Engineering Educator Scholarship by National Science Foundation (NSF), IUCEE Young Leader Award for the year 2015, and IGIP SPEED Young Scientist Award for the year 2014. He previously served as the President of the Student Platform for Engineering Education Development (SPEED) and the Vice-President for Student Engagement of the International Federation for Engineering Education Societies (IFEES) where he has led many student-based initiatives to help solve engineering education issues at the local and global level.

Anurag Palla has completed his undergraduate studies in Mechanical Engineering from PSG College of Technology and his Master's in Industrial Engineering from Purdue University.

After his graduation, he co-founded an EduTech company called Hamzek Solutions. Their first product was an innovative CRM software which added much-needed value for both students, faculty and administrative staff of all the educational institutions. It was acquired by another Hyderabad-based EduTech firm called 'Stumagz' (Forbes -30 under 30 Asia - 2018) in 2019. Anurag and his Co-founder later started building another product which helped students wanting to pursue higher education by reducing their time of processing and application to universities called 'Stuzee'.

Apart from investing and adding value to few chosen companies, Anurag works full-time as the Director of Operations, Strategy and Student Affairs at Anurag University. He started as the Director of Entrepreneurship Development Cell in 2018 with a vision to build an ecosystem to help his students inculcate entrepreneurial thinking.