

Professional Development Program on Active Learning for Engineering Faculty in Chile: First Stage

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Abstract

There is a significant need for improvement in undergraduate science and engineering education; accordingly, the same applies for effective professional development for teachers of engineering in Latin America. The need for a change from a teacher-centered to a student-centered education is becoming an urgent issue. In particular, Chile is investing in funded projects to improve the preparation of future engineers in the country. This work presents preliminary results of an ongoing program of teacher preparation for engineering faculty in a large private university in Chile. The first stage of the project uses Walter and Kautz's (2015) framework to prepare a semester-long program consisting of five workshops (48 hours long) for 20 faculty members. Using a conceptual change approach, the focus of each workshop is the following: 1) Raising awareness within the faculty of the need of active learning to prepare the new generations of students; 2) Introduction to collaborative and active learning strategies; 3) Inquiry-based education; 4) Aligning teaching and assessment; 5) Difficulties on implementing active learning. Each session was designed to emulate active learning dynamics. After each workshop, participants designed and documented the implementation of activities and read various articles related to the workshop topics.

The data collected consists of responses to the Approaches to Teaching Inventory (ATI) by two groups of professors. One group consisted of 76 full time professors of the School of Engineering in which the study was conducted. The other group consisted of a subset of 20 faculty members. Some of the faculty members had previous experience in teacher preparation programs that addressed general education strategies, while others had no experience at all with these strategies. Participants responded the ATI at the beginning of the two-day workshop (first group that includes the second one) and at the end of the workshop sequence (second group of faculty only). This paper analyzes the ways in which teachers changed their perspective regarding teaching engineering and their prior teacher preparation. The results showed that for the majority of the faculty members in the program, some who had previous experience and those who did not have any experience, the implementation of active learning and collaborative learning was different from what they previously thought it was. Their perspective of the teaching practice changed, not only by the activities they carried out in the workshops, but also by the activities they designed and implemented in their own classroom.

Introduction

In higher education, there is a broad consensus on the need to train professionals to work in a world that does not exist yet. Extremely fast social, scientific and technological changes create new realities, new needs and new challenges every day. Moreover, the work of the teacher is immersed in that scenario, a teacher who in many cases did not receive teaching training. This has generated a change in the role of teachers in the process of training professionals and, in fact, a change in the role of students too.

There is a call for a shift from a teaching practice centered on the teacher as a provider of information to a learning centered on the students' needs and learning outcomes. On one hand, teachers must abandon the role of providers of knowledge; and on the other, students must also abandon the role of passive information receivers that has characterized higher

education for a long time. However, this change of paradigm is not easy (Finelli, Daly, & Richardson, 2014). In order to train teachers for this new scenario, many institutions offer opportunities for teacher development through specialized courses. However, there is very little evidence of the effectiveness of these courses.

In this scenario, active learning methodologies appear as a way to improve conceptual understanding and thinking skills of science and technology students for flexible use in the current context. Although there is a clear evidence of the benefits of active learning, professors still use traditional teaching methods.

Helping teachers moving towards a new conception of teaching and learning needs a way of professional development that creates opportunities to reflect and rethink their practices. In this sense, some questions emerge. How, when and in what ways can these spaces of reflection and learning for teachers be created to achieve better results?

Zavala, Alarcón & Benegas (2007) pointed out a very important issue. In extensive training programs, there is a need for convergence of conditions to ensure effectiveness: availability of substantial resources, the need for getting teachers from different places to work together for extended periods of time, political decisions about the characteristics of the educational system, among others. The authors mention that, in many places, these conditions are very difficult to meet, so shorter development courses become more plausible.

For Vescio, Ross & Adams (2008) there is a model of professional development associated with the notion of learning communities. For them, “[...] learning communities offer an avenue to build the momentum of a shifting paradigm in the professional development of teachers and the learning of students” (p. 90, Vescio et al., 2008). In this sense, the term community is used to refer to the situation of learning and working together. As some authors mention (Vangrieken, Meredith, Packer & Kyndt, 2017) the concept does not always refer to an entity, but serves as a metaphor for a collaborative institutional culture.

Learning communities are based on two assumptions: (1) knowledge is situated in the day-to-day lived experiences of teachers and best understood through critical reflection with others who share the same experience; (2) actively engaging teachers in professional learning courses will increase their professional knowledge and enhance student learning (Vescio et al, 2008). Even though teachers assign a high value to work in learning communities, it is still interesting to understand how communities of practice achieve the goal of improving students’ learning through collaboratively examining their practice.

One way to narrow down the problem is to offer specific workshops that allow the reflection about the knowledge of their own practice and the reality of the classroom, but also provide new knowledge or tools associated with teaching strategies that can be used and adapted to each case.

Experiences have suggested that mastering teachers with generic teaching skills was not as effective as we might think. It is not enough to teach them how to lecture, how to use different strategies, how to prepare lessons, how to use different resources, etc. (Ho, Watkins & Kelly, 2001). They do not need recipes. We need to go to the core of teachers’ conceptions about teaching and learning to generate fundamental changes in their practice to improve their students’ learning outcomes.

Some authors propose the conceptual change approach (Posner, Strike, Hewson & Gertzog,

1982), which has shown effectiveness in changing students' ideas about science and conceptual understanding, for the professional development where the intuitive conceptions about teaching and learning need to be overcome (Ho et al., 2001; Walter & Kautz, 2015). To change the focus towards a student-centered higher education Ho et al. (2001) have suggested an approach to professional development that is based on the conceptual theory and pays attention to four separate elements:

- Self-reflection: participants undergo self-reflections and clarify personal conceptions.
- Confrontation: participants are brought to realize possible inadequacies in their existing conceptions and/or teaching practices and thus create an awareness for the need to change.
- Exposure: workshop facilitator provides a direction and a model for improvement.
- Commitment building: workshop facilitator encourages teachers to engage in changes and development.

In their work, Ho et al. (2001) and Walter & Kautz (2015) study the effectiveness of this approach in professional development in relation to changes in teachers' frameworks for conceptualizing teaching and learning.

In Ho et al., the effect of the professional development program was assessed by identifying and comparing the conceptions of teaching with semi-structured interviews conducted before and after the program. Walter & Kautz used the 16-item questionnaire Approaches to Teaching Inventory (ATI), developed by Trigwell and Prosser (2004) for the same purpose. A different version of the ATI questionnaire (16-item, Trigwell and Prosser, 2004; 22-item, Trigwell, Prosser and Ginns, 2005) is used to measure teachers' conceptions about teaching. This questionnaire contains two different kinds of items:

- Teacher focused approach to teaching (TF), related to the "information transmission" way of teaching.
- Student focused approach to teaching (SF), related to a "student conceptual change" way of teaching.

As mentioned on Walter & Kautz (2015) this validated instrument was intended to be an opportunity to reflect on the teaching activity for teachers in a context of professional development programs. The items present different aspects representing certain aspects of the teaching and learning situation in a teacher-centered approach or in a student-centered approach. The agreement is expressed by the teachers on a Likert scale: 1 for "only rarely" to 5 for "almost always". The 22-item English version (Trigwell et al., 2005) contains 11 "teacher-focused" and 11 "student-focused" statements.

With the goal of contributing to improving the professional development, in this paper we present preliminary results of an ongoing program for in-service teacher preparation of engineering faculty in a large private university in Chile.

Methodology

This work presents preliminary results of an ongoing program of teacher preparation for engineering faculty in a large private university in Chile. The first stage of the project uses Walter and Kautz's (2015) framework to prepare a semester-long program that consists of five 48-hour long workshops for faculty members.

To establish the basis of the institutional need for these actions, a two-day workshop (16 hours) was held in June 2016, with the participation of 78 faculty members of the institution. For the activity, all full-time faculty members belonging to the three campuses of the School of Engineering were convened.

Using a conceptual change approach, the focus of each workshop was the following.

- 1) Teacher Workshop. Making faculty members aware of the need of active learning to prepare the new generations of students. During this two-day long workshop 78 participants reflected on their own teaching and the way in which they learn.

Subsequently, a group of faculty members was selected in each campus to continue their training work. These faculty members belong to the Continuous Faculty Training Program (CFTP) prepared by UNIDA. This work was developed in monthly workshops that addressed different topics, described below.

- 2) Introduction to collaborative and active learning strategies. A four-hour workshop in which the main ideas of collaborative learning were introduced and some active learning dynamics were presented.
- 3) Inquiry-based education. In this four-hour workshop, the technique of using questions was presented, from an effective use of questions to the whole class to the use of inquiry-based strategies such as Peer Instruction.
- 4) Aligning teaching and assessment. In this four-hour workshop, different types of assessment were introduced, from formative assessment to conceptual and evidence-based assessment.
- 5) Difficulties in implementing active learning. This six-hour workshop focused on the need to be aware and prepared for the difficulties that teachers face when introducing a change in their teaching strategy. There was a long discussion and reflection on how to address those difficulties.

Each session was designed to emulate active learning dynamics. After each workshop, participants designed and documented the implementation of activities and read various articles related to the workshop topics.

The data collected consists of self-reflections and surveys of the faculty members that participated in the 2-day initial workshop and interviews and documented implementations for each of the 20 faculty members that participated in the workshops along the semester. Participants filled out the Approaches to Teaching Inventory (Trigwell, Prosser and Ginns, 2005) at the beginning and at the end of the workshop sequence.

Participants

Some of the faculty members had previous experience in teacher preparation programs that addressed general education strategies, while others had no experience at all on these strategies.

In the first stage of the program, the Teaching Conference, 78 part or full-time faculty members from the School of Engineering participated. For the second stage, a group of faculty members was selected in each campus to continue training work. The selection consisted of full-time faculty who had previous training in topics of higher education. 20 out of 23 had those previous experiences. Table I shows the number of those for each Campus.

Table I

Participants for each campus. 20 out of 23 full-time faculty members selected to continue training in active learning methodology had previous training in topics of higher education.

Campus	Participants
Campus I	9
Campus II	8
Campus III	6
Total	23

Instrument

The instrument consists of 22 Likert scale items. Table II shows the items of the instrument.

Table II

ATI-22. 22 Likert scale item instrument. The instrument has two dimensions, student focus (SF) and teacher focus (TF).

Item	Statement	Dimension
1	In this subject students should focus their study in what I provide them.	TF
2	It is important that this subject should be completely described in terms of specific objectives that relate to formal assessment items.	TF
3	In my interactions with students in this subject I try to develop a conversation with them about the topics we are studying.	SF
4	It is important to present a lot of facts to students so that they know what they have to learn for this subject.	TF
5	I set aside some teaching time so that the students can discuss, among themselves, key concepts and ideas in this subject.	SF
6	In this subject I concentrate on covering the information that might be available from key texts and readings.	TF
7	I encourage students to restructure their existing knowledge in terms of the new way of thinking about the subject that they will develop.	SF
8	In teaching sessions for this subject, I deliberately provoke debate and discussion.	SF
9	I structure my teaching in this subject to help students to pass the formal assessment items.	TF
10	I think an important reason for running teaching sessions in this subject is to give students a good set of notes.	TF

11	In this subject I provide the students with the information they will need to pass the formal assessments.	TF
12	I should know the answers to any questions that students may put to me during this subject.	TF
13	I make available opportunities for students in this subject to discuss their changing understanding of the subject.	SF
14	A lot of teaching time in this subject should be used to question students' ideas.	SF
15	In this subject my teaching focuses on the good presentation of information to students.	TF
16	I see teaching as helping students develop new ways of thinking in this subject.	SF
17	In teaching this subject it is important for me to monitor students' changed understanding of the subject matter.	SF
18	My teaching on this subject focuses on delivering what I know to the students.	TF
19	Teaching in this subject should help students question their own understanding of the subject matter.	SF
20	Teaching in this subject should include helping students to find their own learning resources.	SF
21	It is better for students in this subject to generate their own notes rather than to copy mine.	SF
22	I present material to enable students to build up an information base in this subject.	TF

Results

We present in three parts the results from three administrations of ATI-22. As mentioned before, ATI-22 was administered to all participants to the Teaching Workshop before it started (PRE). In the first administration, CFTP members were included. Then, there was a second administration of the ATI-22 as a post-test (POST-1) at the end of the Teacher Workshop, in which all participants (including CFTP members) took part. In this case, participants were asked to fill out the ATI-22 thinking about what they planned to do the following semester. We wanted to see whether there was a change due to the workshop. There was a semester-long training program, only for CFTP members, which ended with the administration of the ATI-22 as a post-test (POST-2). The following subsection of results presents data comparing these different stages of the results of the ATI-22.

Impact of the Teaching Workshop

There were a total of 59 participants who took the ATI-22 at both times as PRE and POST-1. In the first analysis, answers to the survey before and after the participation of the 2-day teaching workshop showed significant differences on 12 of the 22 items ($N=59$, $p < 0.01$). Table III presents the results. Note that for each statement the number of responses varies, because in some cases a participant could not rate all the items.

Eight out of twelve items in which there was a significant difference belong to the “student-focus” scale of the ATI questionnaire, and showed changes in the intended direction, that is, higher rates on the Likert scale. In the case of the four items of the “teacher-focus” scale that showed significant differences, three of them (11, 15 and 18) showed changes in the intended direction (lower rates on the Likert scale). In the case of item 22, the change was in the opposite direction. We think that the statement in the Spanish version could have a problem of interpretation.

Another important result to notice is that, in general, all the items related to the teacher focus scale of the instrument presented high rates on the Likert scale, showing that the style of teaching of the faculty members is dominated by the “information transmission” paradigm. We want to highlight this because, even though we had a very short workshop, all the significant differences, except for item 22, represented changes in the expected direction of the teachers’ conceptions of the teaching and learning process.

Table III

Comparison of ATI-22 results before and after the 2-day Teacher Workshop (N= 59). Observe that the green rows are the items in which we found significant difference and the brown row also had a significant difference, but in the opposite direction to what was expected.

Item	SF/TF	Pre test		Post test		t	df	p
		Mean	SD	Mean	SD			
1	TF	3.500	1.091	3.268	1.000	1.822	55	0.074
2	TF	3.839	1.301	3.714	1.044	0.817	55	0.418
3	SF	4.379	0.871	4.414	0.387	-0.331	57	0.742
4	TF	2.542	0.908	2.441	0.665	0.864	58	0.391
5	SF	3.241	1.590	3.966	1.087	-4.351	57	0.000
6	TF	3.414	1.124	3.241	1.064	1.093	57	0.279
7	SF	3.621	1.643	3.948	0.962	-2.046	57	0.045
8	SF	3.431	1.267	3.741	1.072	-1.990	57	0.051
9	TF	2.966	1.516	2.932	1.340	0.219	58	0.827
10	TF	2.879	1.617	2.638	1.182	1.783	57	0.080
11	TF	3.828	1.338	3.500	1.272	2.643	57	0.011
12	TF	3.593	1.142	3.508	1.047	0.671	58	0.505
13	SF	3.672	1.382	4.017	0.859	-2.624	57	0.011
14	SF	2.351	1.018	2.860	1.087	-3.643	56	0.001

15	TF	3.576	0.973	3.288	0.795	2.482	58	0.016
16	SF	4.254	0.538	4.339	0.366	-0.869	58	0.389
17	SF	3.897	0.901	4.224	0.703	-2.815	57	0.007
18	TF	3.667	1.048	3.158	0.885	3.977	56	0.000
19	SF	3.845	0.625	4.172	0.496	-2.754	57	0.008
20	SF	3.695	1.078	4.169	0.454	-3.563	58	0.001
21	SF	3.797	1.165	3.966	1.171	-1.200	58	0.235
22	TF	3.661	0.952	4.000	0.966	-2.350	58	0.022

CFTP members vs the rest of faculty

As mentioned before, CFTP members were selected using two criteria: being full-time faculty members and having experience in teacher development in higher education. We wanted to see whether the selection was different in terms of the dimensions measured by the ATI. Table IV presents the results of comparing CFTP members to non-members in the ATI before starting the initial Teacher Workshop (PRE). There were four items, two in the student-focus dimension and two in the teacher-focus dimension, in which there were significant differences. For items 11 and 12 in the teacher-focus dimension, the results of CFTP members were higher than those of non-members, which indicates that in these two items CFTP members are closer to the “information transmission” paradigm. On the other hand, in items 17 and 19 of the student-focus dimension, the results of CFTP members were higher than those of non-members, which indicated that in this dimension CFTP members are closer to the student-centered paradigm.

We expected that since the CFTP members were selected because of their experience in other training programs, e.g., a diploma in higher education, they would be, from the beginning, more student-centered and follow a “teacher as a guide” paradigm than the other faculty members. It seems that the programs they participated did not succeed in making a significant change in their perception.

Table IV

Initial differences between CFTP members and the rest of the faculty members

Item	SF/TF	Non CFTP members		CFTP members		t	df	p
		Mean	SD	Mean	SD			
1	TF	3,214	1,808	3,591	0,920	-1,384	54	0,086
2	TF	3,446	1,815	3,864	1,742	-1,249	39	0,110
3	SF	4,286	1,117	4,524	0,762	-1,004	43	0,160
4	TF	2,357	0,779	2,429	0,957	-0,293	33	0,386
5	SF	3,089	1,646	3,190	1,662	-0,307	36	0,380

6	TF	3,304	1,306	3,143	1,529	0,518	34	0,304
7	SF	3,536	2,181	3,762	1,190	-0,731	49	0,234
8	SF	3,518	1,672	3,286	1,314	0,763	40	0,225
9	TF	2,696	1,706	2,952	1,148	-0,877	44	0,193
10	TF	2,661	1,828	2,667	1,533	-0,018	39	0,493
11	TF	3,536	1,599	4,095	0,890	-2,101	48	0,020
12	TF	3,429	0,868	3,857	1,229	-1,576	31	0,063
13	SF	3,607	1,625	3,810	1,362	-0,661	39	0,256
14	SF	2,357	1,288	2,571	1,057	-0,791	39	0,217
15	TF	3,375	1,366	3,381	1,048	-0,022	41	0,491
16	SF	4,268	0,636	4,381	0,448	-0,626	43	0,267
17	SF	3,679	1,058	4,333	0,433	-2,710	56	0,004
18	TF	3,536	1,526	3,238	0,890	1,128	47	0,133
19	SF	3,571	1,086	4,000	0,800	-1,788	42	0,041
20	SF	3,821	1,131	3,429	1,357	1,349	33	0,093
21	SF	3,839	1,119	3,810	0,962	0,116	39	0,454
22	TF	3,679	0,804	3,429	1,457	0,864	29	0,197

Impact of the training program

We measured the impact of the 4-month development program (including the Teacher Workshop) by comparing ATI results of the CFTP members from the initial administration (PRE) and the final administration (POST-2). Answers to the survey before and after the development program showed significant differences on 6 of the 22 items ($N=20$, $p < 0.05$) and marginal significant differences on 2 items ($p < 0.07$). Table V presents the results. Note that for each statement the number of responses varies, because in some cases a participant could not rate all the items.

Seven of the eight items that had differences belong to the “teacher focus” scale of the instrument, and showed changes in the pretended direction, towards lower rates. In the case of item 5 (SF scale) the change was in the opposite direction.

Table V

Comparison of ATI-22 results from before and after the 4-month development program (N=20)

Item	SF/TF	Pre test		Post test		t	df	p
		Mean	SD	Mean	SD			
1	TF	3.7	0.642	3.25	1.039	2.269	19	0.018
2	TF	4.05	1.418	3.9	1.358	0.484	19	0.317
3	SF	4.55	0.682	4.6	0.358	-0.252	19	0.402
4	TF	2.45	1.208	2.1	0.937	1.277	19	0.109
5	SF	3.3	1.800	2.35	1.397	2.647	19	0.008
6	TF	3.1	1.463	3.00	1.263	0.418	19	0.340
7	SF	3.7	1.168	3.85	0.450	-0.679	19	0.253
8	SF	3.3	1.168	3.55	0.787	-1.157	19	0.131
9	TF	2.9	1.147	2.45	1.313	1.528	19	0.071
10	TF	2.7	1.695	2.25	1.461	1.577	19	0.066
11	TF	4.00	1.579	3.05	1.839	2.412	19	0.013
12	TF	3.85	1.292	3.35	0.871	1.697	19	0.053
13	SF	3.7	1.379	4.05	0.682	-0.960	19	0.175
14	SF	2.5	1.000	2.65	1.187	-0.484	19	0.317
15	TF	3.6	1.200	3.05	1.524	1.927	19	0.035
16	SF	4.35	0.450	4.3	1.063	0.181	19	0.429
17	SF	4.15	1.397	4.2	0.695	-0.188	19	0.427
18	TF	3.2	1.011	2.6	1.200	2.349	19	0.015
19	SF	4.1	0.516	4.1	0.726	0.000	19	0.500
20	SF	3.6	1.095	3.9	0.832	-1.189	19	0.125
21	SF	3.9	1.042	3.75	1.039	0.547	19	0.295
22	TF	3.6	1.516	3.95	0.576	-1.277	19	0.109

Discussion

The information presented in the previous section are the first results obtained in an ongoing project. The intended objective was to analyze changes in the way teachers conceive and act in the teaching and learning process due to the participation on a professional development

program.

We obtained data in three important moments: before any intervention (pre-test, N=59, named PRE), after the 2-day initial teacher workshop (post-test 1, N= 59 named POST-1) and after the 4-month program (post-test 2, N= 20 named POST-2). The number of participants in each administration corresponds to those participants who filled the instrument both in PRE and POST-1 and those CFTP members who filled the instrument both in PRE and POST-2.

As mentioned before, we found that most of the changes after the 2-day teacher workshop were related to items that belong to the student-focus scale of the instrument. The Teacher Workshop had the objective of making faculty aware of the need for active learning to prepare the new generations of students. It seems that the impact was precisely on student perspectives instead of teacher perspectives. It appears that, even though the workshop was planned to make them aware of the need to change the way in which teaching and learning take place in the classroom, and that included the teacher, the result is that they, indeed, reflected on students but not as much on their role as instructors.

Table VI shows the results of the two dimensions of the PRE. According to the table, the overall initial rates of the student-focus items are high (ideally, these items should be high). With this, it can be argued that the result of the 2-day teacher workshop was to produce changes in the faculty in aspects that has a consensus related to an institutional plan of student-centered education. That is, not only the workshop might have helped in the improvement of the student focus dimension. However, the hard cores related to the teacher-focus items were maintained without significant modifications. Note that Table VI shows that these items are high (ideally, these items should be low). More persistent work in the workshop is needed to generate changes in the teacher-focus items.

Table VI

Overall teacher-focus and student-focus rates before 2-day workshop (N= 59)

TF/SF	Mean	SD	Mode
Teacher-focus items	3.15	1,15	4
Student-focus items	3.41	1.16	4

On the other hand, the changes after the 4-month program appeared in items of the teacher-focus scale. Most of the items in which there was change, were in the teacher-focus dimension. It is significant that the CFTP members improve on their perception as teachers. It is consistent with the work done in the different workshops in which we focus on collaborative and active learning strategies such as inquire-based education, aligning teaching and assessment, and the difficulties they could encounter when implementing active learning. The participants even spent time designing sessions which they used with their own students. The program was a success in this respect; it changed the perception of their role as teachers.

However, it is interesting to note that the items of the student-focus dimension did not change in the same way. There was an item that changed but in the opposite direction. This could be interpreted as CFTP members having a different experience from those who only participated in the Teacher Workshop. That is, during the workshop, the faculty was engaged in listening to new methodologies. They even designed some short activities in the workshop. However,

they did not have the experience of applying these methodologies in a real classroom experience, in which the instructor could face a lot of problematic situations first-hand. That was what happened to CFTP members who, besides having been in the different workshops during the semester, were teaching their own students. Only at the end of the period, a workshop was dedicated to difficulties in implementing active learning, something that they could have faced before that workshop.

Conclusions

This work reports on the assessment of engineering faculty while taking a professional development program to train them on active learning and collaborative learning strategies. The first stage was a four-month long program that consisted of different short workshops, the first of which occurred before the semester started. The results show that the short workshop before the start of the semester was successful in changing the instructors' student perspective in terms of the active role in learning that the students should take, but little effect on the teacher's role in the teaching/learning process. On the other hand, a long workshop during the semester resulted in a positive change in the teacher's role in active learning strategies, but the teacher's perspectives on the role of students did not change significantly. We argued that this effect is due to the difficulties teachers experience with actual students and their minimal experience overcoming those difficulties. In the long workshop during the semester instructors learned how to implement active learning and collaborative learning strategies and some implementations were carried out in the classroom. However, given the time constraints, participants were not able to fully implement the active learning and collaborative learning strategies and workshop instructors were not assessing what participants did in the classroom. The program's plan is to continue the following semester, during which participants will have time to design activities and implement them in a specific course and the workshop instructors will provide feedback on these designs and observe the in-class implementations. We believe that in the implementation semester, participants will improve, not only their perspective on the role they should take, but also their perspective on the role of their students.

Another conclusion we can get from the data is that, even though we chose CFTP members for their previous experience in institutional training programs, those participants were not that different from the rest of the members of the faculty. After having worked with them for a semester, we can attest that faculty members taking general development programs is not effective in terms of what is needed to change the paradigm from a teacher-centered to a student-centered learning process. Faculty workshops that are focused on strategies specifically proven to have worked in the discipline are needed instead.

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