

MAINTAINING CURRICULUM CONSISTENCY OF TECHNICAL AND VOCATIONAL EDUCATIONAL PROGRAMS THROUGH TEACHER DESIGN TEAMS

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Maintaining the quality and relevance of Technical Vocational Education and Training (TVET) curricula is a great challenge for TVET institutions in developing countries. One major challenge lies in the lack of curriculum design expertise of TVET academics. The purpose of this multiple-case study is to explore the potential of professionally supported *Teacher Design Teams* (TDTs), a group of department teachers working collaboratively on a curriculum (re)design task, as an institution-based strategy for improving the relevance of TVET programs to the needs of the concerned stakeholders, namely industry. The study describes how four TDTs from different TVET college departments redesigned their programs systematically and relationally to improve their internal and external consistency. The findings indicated that although the teams found the re-design task a challenge, they felt positive about the TDT experience and its outcomes. The teams also perceived the consistency of their programs to have improved. The criticality of the support offered to the teams and the variety of the teams' design work were salient themes captured during the design process. It is concluded that *professionally supported* TDTs can be an efficient strategy for maintaining the consistency of the TVET curriculum.

Keywords: Teacher Design Teams, TVET, internal consistency, external consistency, curriculum renewal

Introduction

Challenges like the lack of resources and the low professional capacity of Technical Vocational Education and Training (TVET) institutions in developing countries hamper these institutions' efforts in maintaining educational programs of quality and relevance to the needs of the labor market (Gervedink Nijhuis, Voogt, & Pieters, 2012). The purpose of this study is to explore the potential of teacher design teams as an institution-based strategy for maintaining the internal and external consistency of TVET curricula. This study describes how four teacher design teams from different TVET college departments collaboratively redesigned their academic programs *systematically* and *relationally* to enhance their consistency, and how they perceived the process and the outcomes of such endeavors.

Conceptual Framework

Relevant Approaches to TVET Curriculum Design

The concept of 'curriculum' is broadly used in this study to refer to the academic plans or blueprints for student learning (Wiles, 2009). These plans represent the

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‘formal or planned’ curriculum compared to the ‘enacted curriculum’ (the curriculum in action) and the ‘attained curriculum’ (the resultant student learning) (Van den Akker, 2003). There are several approaches in literature that depict the curriculum design process. Visscher-Voerman and Gustafson (2004) synthesized these approaches into four paradigms: instrumental, communicative, pragmatic, and artistic. The first two seem to be relevant to the design of the TVET curriculum.

The first paradigm constitutes a systematic (instrumental) approach, which dates back to Tyler’s (1949) rational-linear approach. In the systematic approach, the development of the curriculum learning outcomes is the focal point that determines the other components of the curriculum such as the content, the learning strategies, and the assessment methods (Visscher-Voerman & Gustafson, 2004). This approach often revolves around an iterative cycle of five phases: analysis, design, development, implementation, and evaluation. The second paradigm represents a relational (communicative) approach that recognizes the social context of the design. A key activity in the communicative approach is the extensive collaboration and deliberation between the curriculum developers and the stakeholders throughout the design process to reach consensus about what the curriculum should be like (e.g., program structure, content, and pedagogy) and how it should be developed and implemented (Kessels, 1999).

Kessels (1999) advocates the simultaneous use of these two curriculum design approaches. He explains that the successful application of the systematic approach results in a well-organized curriculum with robust ‘internal consistency’ defined as coherence between the curriculum components and levels whereas the adoption of the relational (communicative) approach enhances the curriculum ‘external consistency’ defined as harmony in the perceptions of the stakeholders about what the curriculum outcomes are, and how they can be realized. Kessel’s blend of these two approaches holds great promise for the (re)development of the TVET curriculum.

Potentiality of Teacher Design Teams for Enhancing Curriculum Consistency

Teachers are increasingly expected to play the role of curriculum designers rather than curriculum implementers in order to establish their curriculum ownership (Marsh & Willis, 1999; Van den Akker, 2003). Teachers’ involvement in curriculum design needs, however, to be within a collaborative framework whereby the multiple viewpoints and collective expertise of teachers lead to curricular improvements across the educational program (Pukkila, DeCosmo, Swick, & Arnold, 2007). Teacher Design Teams (TDTs) is an increasingly advocated institution-based curriculum design strategy, especially in a K-12 context. A TDT can be defined as ‘a group of at least two teachers, from the same or related subjects, working together on a regular basis, with the goal to (re)design and enact (a part of) their common curriculum’ (Handelzalts, 2009, p. 7).

Empirical literature reports positive impact on various aspects for adopting TDTs. Besides being an effective teacher professional development strategy (e.g., Voogt *et al.*, 2011), findings also indicate that TDTs can also improve the harmony between the formal and the enacted curriculum (internal consistency) and enhance teachers' collaboration on and ownership of the department curriculum (Handelzalts, 2009). In a TVET context, teacher collaboration is expected to involve external stakeholders such as industry representatives in order to establish the curriculum external consistency (Akomaning, Voogt, & Pieters, 2011; Kessels, 1999).

As TVET institutions in developing countries are mandated to maintain and enhance the quality and relevance of their educational programs, the potential of TDTs for improving the internal and external consistency of TVET programs is a research area awaiting further investigation. Thus, this study investigates how four TDTs from four different TVET college departments endeavored, after receiving relevant training and support, to improve the internal and external consistency of their programs through applying systematic and relational curriculum design procedures. The two research questions that guided the data collection and analysis of this study are:

1. How do teacher design teams in TVET colleges redesign their curricula systematically and relationally, and what design outcomes did they achieve?
2. How do TVET department teachers value the teacher design teams' process and outcomes as a strategy for maintaining curriculum consistency?

Methodology

This study adopted an embedded multiple-case design (Yin, 2003). The cases in this study were four TDTs representing different departments in a TVET Community College. The participating team members along with the resultant curricular products formed the units of analysis. The teams participated voluntarily in this study. Each team was composed of three teachers including the Head of Department (HoD), functioning as the team leader.

Study Context

Sanaá Community College is a leading post-secondary TVET institution located in the capital city of Yemen. HoDs and teachers at community colleges in the country are mostly professionals without pre-service training on curriculum development and pedagogy. A previous study (Albashiry, Voogt, & Pieters, accepted) found that curriculum design practices within the college departments were mostly individual, ad hoc, and centered on modifying the contents of individual courses, thereby affecting the interconnectedness of the whole program (i.e., an internal consistency issue). Another major curricular problem identified was that

the departments' formal curricula (e.g., the program/course descriptions) were either missing or ill-defined.

Procedures

Before the four TDTs started to work on re-designing their programs, there were initial plenary sessions with the participants and management in which that participants decided on the goal of the project. The participants decided to redesign their programs with more alignment with the needs of the stakeholders (external consistency). Afterward, each HoD selected, on a voluntary basis, a number of teachers to work on the program renewal undertaking. The TDTs had weekly meetings, and the project lasted for about one full semester. TDTs received various forms of professional support before and during the actual program redesign task. Both the HoDs and teachers received training on the basics of systematic and relational curriculum design. HoDs, however, received further training that addressed their role as curriculum leaders, including how to lead TDTs. Besides the training, the participating TDTs were provided with a curriculum design guide (containing hand-outs, templates, and exemplary materials). Moreover, the teams received coaching during their weekly design meetings by the project coordinator (the first author) and by a curriculum consultant from the college.

Data Collection and Analysis

To improve the study credibility and trustworthiness, triangulation of data collection methods and use of sound systematic data analysis procedures were employed. Data collection methods included interviews with the participants, observation of the TDTs' sessions, TDTs' meeting minutes, and the researcher's field notes. All the data collected were analyzed using common principles in qualitative data analysis such as data reduction, data display, and conclusion drawing (Miles & Huberman, 1994; Thomas, 2006). Data were cleaned up, reduced, and transformed to a common format. Qualitative data analysis software (Atlas.ti7) was used to code the data based on broad themes originated from the research questions and the conceptual framework of the study.

Findings

Teacher design teams in TVET colleges redesign their curricula systematically and relationally, and what design outcomes did they achieve?

Findings are presented here by case (TDT), and within each case the findings are organized around what each team did during three major phases of the systematic design cycle (i.e., analysis, design [including the development of design products], and formative evaluation), and what challenges they encountered in each phase. Activities related to internal and external consistency conducted by the teams are

highlighted throughout these design phases. Table (1) shows a summary of the four TDTs’ design outcomes.

TABLE 1: TDTs’ DESIGN OUTCOMES

	<i>Dept. mission</i>	<i>Dept. goals</i>	<i>PLOs*</i>	<i>Program description</i>	<i>Course descriptions (N)</i>	<i>Curriculum map**</i>
TDT <i>a</i>	X	X	X	X	X (10)	X
TDT <i>b</i>	X	X	X	X	X (13)	X
TDT <i>c</i>	X	X	X	X	X (8)	X
TDT <i>d</i>	X (draft)	X (draft)	-	-	-	-

Note: * PLOs= program learning outcomes, ** curriculum map: an outline aligning courses with the PLOs

TDT a. This TDT formed a program advisory committee (a subject matter expert, industry representatives, and the department teachers) that they involved throughout the three curriculum design phases. The team leader explained that he could not invite more industry representatives to attend the regular meetings as they were too busy. During the analysis phase, the team sought to assess the current status of the program and consider areas for improvements through involving various stakeholders (external consistency). The team involved the department alumni (a focus group) and students (a questionnaire), compared similar programs from other colleges, consulted the advisory committee, and reflected on the program improvement needs within the team. Besides a difficulty in synthesizing the analysis data, as noted by a teacher, the team leader noted that it was difficult to involve more industry representatives and to get clear guidelines about allocating credit hours for the various types of courses.

For the design phase, TDT *a*, through several rounds of drafting, developed several documents (see Table 1). When re-positioning courses, it was observed that the team went back and forth between the course learning outcomes, ensuring their alignment with the program outline and program learning outcomes (PLOs)—internal consistency. The development of the PLOs accurately and comprehensively and mapping the curriculum were hard tasks and time consuming as reported by the team teachers. The formative evaluation of the designed artifacts was conducted by the team itself and the advisory committee that attended most of the team’s weekly meetings (internal and external consistency).

TDT b. In the analysis phase, this TDT involved various stakeholders with the purpose of integrating their feedback into the newly designed program (external consistency). The team interviewed some department teachers, surveyed a sample of the department students and alumni, and conducted visits to repair departments of major automotive agencies in the city to get their input on the skills expected of the graduates of this program. Unlike TDT *a*, this team could not find industry representatives willing to take part in their regular design meetings as they were

not, according to the team leader, *extrinsically* motivated to be involved in curriculum design projects. Major obstacles in the analysis phase, as reported by the team, included the lack of time to conduct this phase more comprehensively and a difficulty in developing and analyzing interviews and questionnaires.

For the design phase, the team members collaborated to develop several documents (see Table 1). Besides time constraints, the team found these design artifacts along with the task of linking courses to the PLOs (internal consistency) a great challenge. One teacher explained that it was their first time to write these aspects of the curriculum, "*As you saw, our initial phrasing of the program learning outcomes was like a list of topics*". The team leader also pointed out, "*it [developing the PLOs] was time consuming, took 3 to 4 weeks. We did not expect that and we did not have any previous experience in such matters*". For formative evaluation, the team explained that they evaluated the design products (e.g., PLOs, and course descriptions) within the team and by some academics from the department who have a higher academic degree (internal and external consistency).

TDT c. This team, in the analysis phase, involved a limited number of target employers (an interview), department students (a focus group and a questionnaire), and few department teachers to get their suggestions for improving and restructuring the study program (external consistency). The team members, during their regular meetings, also reflected on the needed program improvements based on their experience. In assessing the current status of the program, the team encountered several challenges including uncooperative department teachers, a difficulty involving more industry representatives (due to the team's lack of time and the scarcity of subject matter experts in their field), and a difficulty synthesizing the analysis data in a way that was informative for the design phase (internal consistency) as the team leader noted.

In the design phase, making use of similar programs from other colleges and the data from the analysis phase, the team developed the documents shown in Table 1. Besides a difficulty in stating the PLOs comprehensively, conflicts of opinions in this phase appeared to be a major challenge for this team. In the words of one teacher, "*We did not have a shared vision. We came from different academic backgrounds and experiences, and everyone thought her ideas were more appropriate. We did not agree on the content of courses and the phrasing of learning outcomes*". For formative evaluation, the team reported that they could not find external evaluators, so they evaluated each other's work during the regular meetings, and consulted the project coaches (internal and external consistency).

TDT d. This team was the least productive and, in fact, quit early in the project due to time pressure and departmental problems such as the lack of teachers, which resulted in work overload on the current department teachers including the team members. The team did not hold regular meetings during the project except for very few informal sessions (mostly in pairs) because of conflicting teaching

schedules and work pressure. Unlike the other teams, this team did not conduct analysis activities except for exploring similar programs. Based on reviewing similar programs and the team's perceptions of the department curriculum problems, the final design products were drafts for the department mission, goals, new student admission criteria, and a modified program outline in which they added, deleted and merged some courses. The team leader also pointed out that there was no time for seeking experts' feedback (i.e., formative evaluation) on these curricular products.

TVET department teachers value the teacher design teams' process and outcomes as a strategy for maintaining curriculum consistency?

The findings here captured the participants' reactions to the TDT experience including the support received before and during the program redesign endeavor. Since team *d* dropped out early in the project, findings are reported here based on data collected from teams *a*, *b*, and *c*.

TDT *a*. TDT *a* members appreciated both the learning about and the application of a systematic approach during the TDT experience. The team believed TDTs had great potential as a strategy for continuous curriculum renewal. One teacher explained that they previously had a superficial view in the department about curriculum design, interpreting it as choosing course syllabi to be covered by the course teacher while now they became aware of how collaborative and systematic this process should be. The team leader pointed out that the TDT undertaking raised his team's awareness not only about the importance of collaborative curriculum design within the department, but also about the need to extend such collaboration to include other stakeholders such as the college management, subject matter experts, and industry.

For the outcomes of the TDT experience, the team members unanimously appreciated their improved formal curriculum from lists of topics and software to detailed plans for the overall program and the individual courses. The team leader appreciated that they now have a better detailed and documented curriculum, and that the department would now look more professional. In the words of one teacher, "*In the past, the department did not have a vision or goals. The curriculum documents developed now would facilitate the teacher work. Now things are clear for both the teachers and the students*".

TDT *b*. Like team *a*, TDT *b* highly valued the TDT experience and the outcomes they achieved. Reflecting on their previous individual and ad hoc curriculum design practices, they all believed in the potential of TDT as an effective strategy for systematic program renewal. They also explained that the TDT undertaking changed their beliefs about curriculum and curriculum design. One teacher explained that they used to perceive the department curriculum as the textbooks to be taught. The other teacher explained that the TDT experience afforded them the opportunity to

conduct industrial visits and hence know more about the new trends in the market and the employers' expectations of the program graduates. The team also appreciated how this strategy enhanced their learning about curriculum planning and promoted collaboration between the team members and other departments with which they shared common courses. The team leader also noted that the TDT experience fostered teacher commitment to the curriculum work as they had to show up for the team regular design meetings. Regarding the TDT outcomes, the team highly valued their design products. They explained that their systematic design of the curriculum helped them develop detailed plans for their core courses, which would improve the clarity of the curriculum and help in teacher evaluation.

TDT c. Except for challenges arising from conflicts between the team leader and the teachers about managing the design undertaking and deciding on the new curriculum content, the team members felt positive about the systematic design endeavor as there were not such design activities in the department before. The team leader appreciated how the TDT experience supported them in designing their program systematically. In her words, the TDT endeavor “*showed us how to develop the curriculum systematically based on data collected from the students and the labor market*’. Curriculum design for us was just about deleting or adding a course in a random way without guidelines or principles”. Like the other teams, team *c* stressed that TDTs should be an annual activity for all college departments for its potential in promoting curriculum collaboration in departments and providing professional development opportunities for teachers such as learning about systematic curriculum design and subject matter knowledge.

Regarding the TDT outcomes, team *c* appreciated the clarity and detail of their redesigned curriculum. The team leader considered the redesigned program and courses a huge step compared with the previous version of the department formal curriculum. She explained that the department teachers would now get clearer course descriptions, and that the department students would now have a better picture about the program outcomes they would have mastered upon graduation. In the words of one teacher, “*The thing I most appreciate is ending up with a product which is the program specifications document, and learning how to work systematically*”.

Discussion and Conclusions

This study attempted to examine the potential of TDTs as an institution-based strategy for maintaining the consistency of TVET educational programs. Despite the challenges the teams encountered in applying a systematic and relational approach to improve the internal and external consistency of their programs, the participants highly valued the TDT experience and unanimously believed that TDTs had great potential as an effective strategy for maintaining the consistency of their curricula and for teacher professional development (Bakah, Voogt, & Pieters, 2012; Voogt *et al.*, 2011).

In their efforts to improve the program external consistency through applying a relational approach, the findings clearly suggest that the TDTs find reaching and involving external stakeholders (e.g., prospective employers and subject matter experts) as co-designers harder than involving internal stakeholders (e.g., students and department teachers) as the first do not see any return on investment by being involved in curriculum design projects at TVET institutions. This difficulty of establishing external consistency seems to be a natural consequence of the lack of formal coordination between TVET institutions and industry/businesses regarding curriculum development in developing contexts (Akomaning *et al.*, 2011).

Although less challenging in terms of feasibility, attending to curriculum internal consistency through applying a systematic approach was a time- and effort-demanding process. This approach appeared to be a novel and complex change for the departments compared with the previous individual and content-based curriculum design practices (Albashiry *et al.*, accepted). This explains why the TDTs struggled with this approach and why there was a need for coaching and just-in-time support (Handelzalts, 2009). The study findings also suggest that the way the TDTs teams perform, the products they develop, and the support they need all vary based on various variables such as the unique departmental context of each team (e.g., academic workload, flexibility of scheduling, and cooperation of department teachers) and the leadership qualities of the team leader (Handelzalts, 2009).

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