Translation

Educ. Technol. Res., **36**, 113-123, 2013

The Use of Program FD in Promoting Quality Undergraduate Education in Niigata University*

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Received for publication, May 2, 2013

This study examined the practice and function of Program FD, which aims to give substance to educational programs and improve educational issues in Niigata University. Based on the university's framework of four educational target domains, the teaching staff in each educational program implemented Program FD by re-examining the objectives and re-orienting its curriculum map from the perspective of reallocating individual courses. As a result, the teaching staff's common understanding of the objectives was promoted in the course of reallocating and weighting the courses with these objectives. Moreover, the re-orientation of the curriculum map functioned as a framework for rendering the coherence and alignment of the curriculum visible. The results suggest that the use of Program FD may be a concrete approach to supporting continuous curriculum improvement. Finally, we discussed issues relating to the future development of Program FD, which is expected to be implemented in daily educational activities.

Key words : Undergraduate education, Educational improvement, Objectives, Curriculum coherence, Program FD

1. INTRODUCTION

With the advent of the knowledge-based society in the modern era, university education is facing a phase of major reform. A recent report by the Central Council for Education (MEXT 2008) indicates the necessity for organizing and implementing curriculum coherence to nurture students through "undergraduate education." This is a shift away from conventional university education based on "knowledge-teaching," to an education that places the emphasis on the learning outcome, which is based on setting concrete educational targets, such as "knowledge/understanding," "generic skills," and "attitude/directional quality." The establishment of policies regarding academic degrees and the systemic organization of the educational curriculum is said to be crucial in Japan's higher education sector (MEXT 2008). This follows an international trend, which is exemplified by the OECD's framework on the Assessment of Higher Education Learning Outcome (AHELO).

Regarding university reform, issues that require continued investigation have accumulated since the Deregulation of University Act in 1991, for example, defining the concept of liberal arts education, university evaluations, and issues regarding graduate schools, including expert education (e.g., Terasaki 1999; Yamada 2003; Shimizu 2003). With this act, universities obtained the flexibility to organize their own curriculums, though under the conditions of "self-check and evaluation" (Shimizu 2003). Terasaki (1999) warns that the necessity of curriculum reform is an essential task for universities, and mentions that without a new educational goal, it would be difficult to conquer the tasks required for university reform. This indication suggests that a reconstruction of the university's educational system, involving the re-examination of educational goals on the institutional level and the clarification of goals in human resource development on the academic level, would encourage the resolution of issues facing university education.

Recently, universities have been expected to reinforce and communicate their independent approaches, following the mandated FD for improving university education (MEXT 2008) and amendments to the School Education Law (MEXT

* This paper was originally published in *Jpn. J. Educ. Technol.*, Vol.36, No.2, pp.147-157(2012)

2010), which require the disclosure of information regarding university education. FD in Japan's higher education sector ranges in terms of objectives and implementation targets, from practices aimed at "course improvements" (Yoshida 2001) and training and support for first-year university instructors (Taguchi *et al.* 2006), to curriculum improvements implemented by the academic staff (Ogawa 2010). In terms of the current effort to give substance to undergraduate education, this paper defines FD as "training that is not simply intended for course improvement, but an enterprise aimed at reforming undergraduate education by improving the occupational ability of the academic staff" (MEXT 2008). Cases of practical approaches, such as curriculum improvements, have increased in recent years, and progressive cases in national universities have been reported by Yamaguchi University, Ehime University, and Hiroshima University. For example, at Yamaguchi University, since the 2003 academic year, syllabus objectives have not been set on the basis of the faculty's academic standard or student status, but have been described as criterion-referenced educational objectives, which take the provisions of the degree awarding policy into account (Oki and Tanaka 2006). The approach of specifying objectives is commonly seen in progressive cases, and a "curriculum map" or "curriculum tree" is prepared to indicate a systematic layout of courses based on the objective (Oki, Miyaura, and Inoue 2001). The development and improvement of these curriculum maps are systematically carried out through workshops and training programs (Ogawa 2010). The purpose of these activities is to enable course instructors to become aware of the compatibility of their own course with the objective, assist them in grasping the current situation, and thereby, aid them in improving the curriculums.

Niigata University has employed an educational program since the 2007 academic year based on the program established at Hiroshima University, which has employed an innovative educational structure based on a target-attainment-type educational program since the 2006 academic year. Conventional departments and faculties have been reformed into educational programs from the perspective of human resource development, and the goals for each program were specified. This approach allocates the courses offered in educational programs and aims to render the curriculum coherent based on educational target domains, which contains the goals for human resource development. Forty-two programs in nine departments have been established as of the 2011 academic year. The courses are positioned on a chart known as the "curriculum map" based on educational target domains. Three educational target domains are common across the university—"knowledge/understanding", "domain-specific skills", and "generic skills"—while "attitude/orientation" is expected to be acquired throughout the program. In the educational program, the objectives for each program were set, and the education is implemented based on the above four educational target domains. In the 2005 academic year, the conventional division between liberal arts and special subject courses was removed, and the category of "all-department courses" was established. This allowed students to freely select and earn credits for courses outside of their major. At the same time, a "visualized method for indicating the field and level" was introduced to provide a benchmark for the field and level of each course in order to support students in their selection of courses.

The efforts described above create a large framework for university education reform and allow students to design learning plans that utilize all-department courses offered at a university, without depending on the students' major. It is also useful for the academic staff, as it can be used as a framework for course allocation and for systematically structuring the courses offered within the educational program according to educational levels (introductory or advanced). Validating these frameworks, however, has created problems, which can be summarized into two parts (Hamaguchi 2011). The first problem is shifting the awareness of the academic staff. Instructors are expected to shift their mindset from the conventional faculty/department affiliation, which is based on strict academic categories, to an educational program structure that foresees the potential of students and allows them to cross multiple disciplines. The second problem is the positioning of courses. With the implementation of the educational program, courses offered in the program must be provided according to the structured system. However, in the current situation, courses are highly dependent on each instructor's academic background and ability. The "lack of integration between liberal arts and specialized courses," the "underdeveloped systematic study of curriculums," and "society's

low interest in university education" (Arimoto 2003) are indicated as the causes of the common problems faced by curriculum reform of undergraduate education. This implies that promotion of undergraduate education is not dependent on individual instructors, but is a task requiring the contribution of all academic staff. Therefore, it is necessary for the university as a whole to establish a sustainable framework for the entire educational program structure.

Taking this notion, an approach to completely and continuously lead university education reform must be sought in order to respond to the ever-changing educational systems and needs of society. In the 2010 academic year, Niigata University made a plan to enhance and improve education in line with their educational visions and goals, and thus, officially began the "re-organization of the curriculum map," (Ikuta *et al.* 2011). The action was conducted with the cooperation of the Institute of Education and Student Affairs, which strove to provide consistent support to students (hereafter referred to as simply "Institution") and each educational program. In this paper, "Program FD" is defined as the academic staff's continuous deliberation of concrete objectives according to the four educational target domains of Niigata University based on the educational program's goals for human resource development. Program FD accords with the aforementioned progressive cases, and involves an investigation into the university's curriculum coherence, including a "re-evaluation of educational goals" (Terasaki 1999).

This paper examines the practice and function of Program FD for improving the educational situation at Niigata University. From the perspective of curriculum coherence, this is a significant practice that provides a framework for promoting curriculum reform, leading to the facilitation of undergraduate education.

2. PROGRAM FD: FRAMEWORK AND METHOD

2.1 Framework

2.1.1. Curriculum Map Based on the Four Educational Targets

As previously mentioned, Niigata University established a target-attainment type of educational program in the 2007 academic year. The objective of the educational program is described as the program's goals for human resource development and is specified in the "program syllabus." The objective is described based on the common framework of "knowledge/understanding," "domain-specific skills," "generic skills," and the "attitude/orientation expected to be acquired" (hereafter referred to as the "four educational target domains") (Table 1). The program syllabus became available to students online in the 2009 academic year. Parallel to the above efforts, a "curriculum map" was created to indicate which of the four educational target domains each individual course addressed in the educational program (Table 1. Pre-evaluation). The conventional curriculum map (pre-evaluation) is meaningful in providing a visual map of the entire educational program, which indicates the placement of individual courses within the objectives and in accordance to the courses' characteristics. This type of map, however, does not show the extent to which a particular course contributes to the target-attainment, and therefore, it lacks the ability to evaluate the allocation of the course within the curriculum system.

Using this conventional curriculum map to

Table 1. The curriculum map in the pre- and post- evaluations (Living Sciences Program)

Pre-evaluation	knowledge/ understanding			domain-specific skills				generic skills			attitude/ orientation			←four educational target domains
Name of courses	a	b	c	a	b	c	d	a	b	c	a	b	c	←objectives
Introduction to Food Science	○	○	○	○	○		○			○	○	○	○	
Introduction to Clothing Science	○	○			○	○	○			○	○	○	○	<pre-evaluation>allocation of courses of objectives
Seminar on Human Life Sciences B	○	○		○	○	○	○	○	○	○	○	○	○	<contents of evaluation>re-examining objectives, reallocation of courses and weighting of the objectives
Exercise on Region and Human Welfare	○	○		○	○	○		○	○		○	○	○	

Post-evaluation	knowledge/ understanding								domain-specific skills						generic skills						attitude/orientation				total
Name of courses	a	b	c	d	e	f	g	h	a	b	c	d	e	f	a	b	c	d	e	f	a	b	c	d	
English															100										100
Introduction to Food Science					70						10									10	5	5			100
Introduction to Clothing Science		12	12				26		10	10			10							10	5	5			100
Seminar on Human Life Sciences B			10		30						20				5		5	5	5	5	5	10			100
Exercise on Region and Human Welfare	10								20						10	10				20	15	5	5	5	100

visualize the course levels, Program FD was implemented as an attempt to re-organize the curriculum map from the perspective of re-examining the objectives and determining the degree to which individual courses contributed to the objectives.

2.1.2. *Overview of Program FD*

To ensure the quality of education in the program, the purpose of Program FD lies not only in improving the education provided by individual instructors, but also in continually evaluating the objectives prescribed by the affiliated group of academic staff within the educational program.

In terms of the university's quality assurance, the outcome of the continued evaluation by a group of academic staff is expected to contribute to the improvement of education in the university as a whole. In detail, the approach uses the conventional curriculum map in order to reexamine the objectives based on the perspective of human resource development and to assess (in figures) each course's degree of contribution to the objective (Table 1. Post-evaluation).

2.2. *Methods*

2.2.1. *Subjects*

As of December 2011, 14 out of the 42 educational programs are working on Program FD. Among them, the following two educational programs that have tentatively completed re-organizing their curriculum map have been selected as the subject of this study (the numbers in the parentheses correspond to the number of academic staff participating in this study):

(1) Faculty of Education: Living Sciences Program (6) (hereafter, "Living Sciences");

(2) Faculty of Agriculture: Forest Science and Engineering Program (13) (hereafter, "Forest Science and Engineering").

2.2.2. *Procedure*

Program FD was conducted using the following procedures with the cooperation of the educational programs:

(1) Assumption: The common understanding of Program FD and the need to re-organize the curriculum map.

(2) Discussion of the Review Policy: Sharing policies among the educational program's academic staff regarding the weighting process and the re-examining objectives.

(3) Re-organization of the Curriculum Map: Reallocation of courses and weighting objectives based on the re-examined objectives.

According to the above procedures, the members of the Institution used an ethnomethodological approach (Flick 1995) and participated in the evaluations conducted in each educational program, while recording the interactions of academic staff in their field notes.

2.2.3. *Period*

The implementation period for procedures (1) to (3) was approximately 1 year, from August 2010 to July 2011, while the time taken for each process fluctuated between the educational programs.

3. RESULTS

3.1. *Implementation Structure of Program FD and Re-examination of the Objectives*

We will first present the results for the

Table 2. The implementation structure for Program FD and its procedures

Procedure	Period	Involvement by Institute of Education and Student Affairs	Approach by Educational Programs	Range of paper
(1) Assumption	Aug to Sep 2010	Explain the necessity of re-examining objectives of educational program in order to substantialize objectives achievement program at Department meetings for each Faculty, and request cooperation.	Based on the Organization's request for cooperation, the strengths and weaknesses of the approach will be examined for each educational program.	○
(2) Resetting objectives based on purpose of nurturing human resources	Oct 2010 to Feb 2011	Provide a course overview sheet as resource for creating a curriculum map, and materials necessary for re-examining objectives of educational program.	Examine criteria and principles for resetting re-examining the objectives, and reset objectives.	○
		Faculty from the Institution will participate in the reexamination process at each program and provide appropriate support.		
(3) Course allocation and weighting	Mar to Jul 2011	Provide feedback on creating files for checking course allocation based on weighted results.	Weigh all courses offered at each educational program. (Criteria and principles of each program will be respected.)	○
		Faculty from the Institution will participate in the reexamination process in each program and provide appropriate support.		
(4) Weighting verification	From Aug 2011	Organize weighted results on a radar chart by the objectives, and simulate using past student grade data.	Reexamine weighted results based on curriculum coherence and the results of the simulation mentioned on the left.	×

implementation structure of Program FD before discussing its implementation in each educational program from the perspective of the objectives.

3.1.1. *Implementation Structure of Program FD*

The process of Program FD is shown in Table 2. Since this approach was conducted with the academic staff's understanding of the need to re-organize the curriculum map, the Institution provided an overview of Program FD and requested its implementation. Given the explanation, each educational program deliberated on its strengths and weaknesses (Table 2 (1)). Next, based on this common understanding, staff members discussed the objectives, reallocation of courses in the curriculum map, and weighting policy (Table 2 (2)). From the perspective of building an educational policy for the entire university, members of the Institution participated in the discussions, and collected data to understand the current conditions of the educational programs, while providing informative material about the curriculum map. The results of the course reallocation and weighing were subsequently reflected in the curriculum map (Table 2 (3)).

Based on this process, each educational program carried out their own discussions. Whether the results of the discussions are actually adaptable for students is currently being deliberated as of December 2011 (Table 2 (4)). As Program FD is still being implemented, this paper evaluates the reorganization of the curriculum map (Table 2 (1)-(3)), focusing on the pre- and post-evaluation content changes regarding the objectives and weighting of educational programs (Table 2 (2), (3)).

3.1.2. *Re-examination of the Objectives of the Educational Programs*

The changes made to the number of objectives and their content was investigated in order to observe the pre- and post-evaluation trends (Tables 3 and 4).

The results revealed that both the Living Sciences and Forest Science and Engineering increased the number of objectives. Due to this increase, the descriptive contents became more simplified (Table 4. Living Sciences) and specific (Table 4. Forest Science and Engineering), while the content of the objectives was divided into sections and clarified as a whole.

Table 3. The changes made to the number of objectives

Name of educational program	**Four educational target domains**			
upper section: pre-evaluation lower section: post-evaluation	knowledge/ understanding	domain-specific skills	generic skills	attitude/ orientation
Living Sciences Program	3	4	3	3
	7	6	5	4
Forest Science and Engineering Program	2	3	1	1
	6	4	6	4

Table 4. Results of re-examining the objectives

Educational Program		**Objectives (2 cases extracted from each program)**
Living Sciences (Extracted from "Knowledge/ Understanding ")	(Pre)	**a)** To provide reason and explanation on phenomenon and situation regarding daily activities and settings. **b)**To recognize and comprehend the relation between surrounding society and nature.
	(Post)	**a)** To grasp issues in one's own living environment. **b)** To explain basic data processing methods to solve issues in the living environment.
Forest Science and Engineering (Extracted from "Generic skills")	(Pre)	**a)** To acquire a broad perspective and an in-depth refinement, and have a sense of autonomy and solidarity to succeed globally.
	(Post)	**d)** To explore tasks and acquire skills in logical development and presentation/discussion for presenting results. **e)** To have great creativity and application, and the skill to systematically design theory and technique necessary for task exploration.

3.2. *Results for the Individual Educational Programs*

We focused on the changes made in the number of courses for each objective and the contribution of courses to the corresponding objectives in the pre- and post-evaluations. To assist with the data interpretation, this section includes additional information regarding the specific characteristics of each educational program and the discussion process recorded in the field notes.

3.2.1. *Living Sciences*

To review the course allocation, the number of courses for each objective and their contribution rate were calculated in the pre- and post-evaluations (Fig. 1). The contribution rates of the courses were calculated by dividing the number of courses allocated to the corresponding objective by the total number of courses.

A new evaluation committee was established for re-examining the objectives in the Living Sciences. During the committee's discussions, the academic staff recognized that in the pre-evaluation, the objectives and their correspondence to the courses were not adequately examined, and they thus saw the need to re-examine the objectives. Furthermore, in order to implement each course

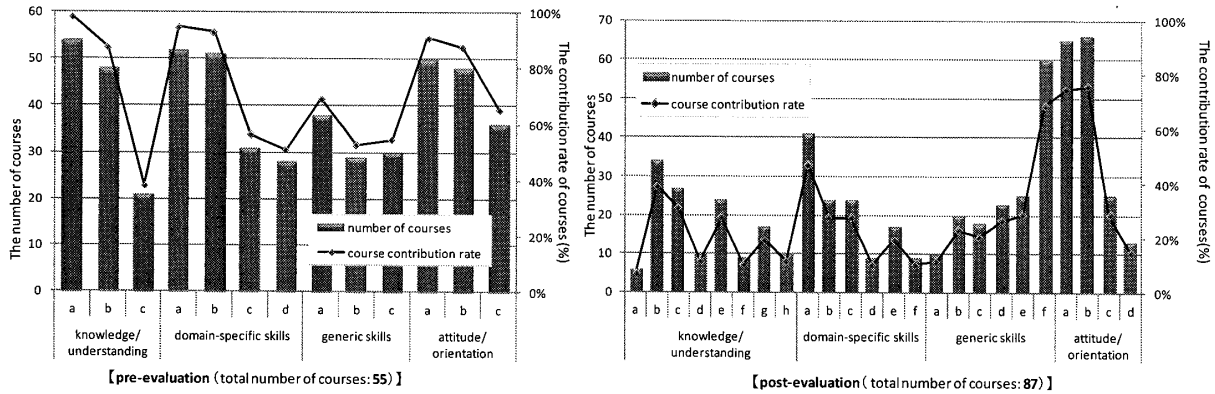

Fig. 1. The course allocation and the course contribution in pre- and post- evaluations (Living Sciences)

based on the new objectives, it became standard to determine the weight of the courses with regard to their actual contents and ratings. Each course was weighted by its respective instructor based on the new objectives. The post-evaluation curriculum map was thus created after six evaluation meetings (Fig. 1. Post-evaluation).

Before the evaluation, the contribution rate of courses to the six objectives was over 80% (Fig. 1. Pre-evaluation), but these rates decreased after the evaluation (Fig. 1. Post-evaluation), indicating a better organization of the courses and their correspondence to the objectives. Furthermore, in the post-evaluation, the objectives were more divided into sections, and the course allocation became more dispersed. In short, the objectives for the three educational target domains ("knowledge/understanding," "domain-specific skills," and "generic skills") were divided into sections and simplified (Table 4. Living Sciences), which suggests that each course was re-oriented according to its association with the objectives. On the other hand, for "attitude/orientation" ("a. interest in daily life scenes", "b. proactive efforts"), this objective was found in over 70% of all courses, which indicates the difficulty in associating courses with the objectives. The educational target domain of "attitude/orientation," including the evaluation of the emotional factors such as learning motivation and attitude, may need to be discussed further in relation to the re-examination of educational targets.

3.2.2. Forest Science and Engineering

Following the same procedure as the Living Sciences, the number of courses corresponding to each objective and their contribution rates were calculated for pre- and post-evaluations (Fig. 2). Since the 2009 academic year, Forest Science and Engineering has been accredited by an external reference, the Japan Accreditation Board for Engineering Education (JABEE), for the purpose of developing technical experts. The JABEE criteria are used for evaluating the daily educational activities, and for this reason, the academic staff agreed to use these criteria for re-examining the objectives and reallocating and weighting the courses.

A new evaluation committee was established, but several of the instructors made an initial draft of the new objectives according to the external criteria and the educational program's goals for human resource development. The draft was then revised in a series of five evaluation meetings. Respective instructors weighted their courses based on the revised objectives, and the results were again deliberated at an evaluation meeting and were agreed upon by the academic staff.

Before the evaluation, each objective was allocated a course, and while "generic skills" and "attitude/orientation" both had a set objective, no courses were allocated to them (Table 5. Pre-evaluation). After the assessment, courses were allocated to all four educational target domains (Table 5. Post-evaluation), and consequently, course allocation became more balanced as a whole (Fig. 2). The third section of "attitude/orientation," "c. ability to think through problems," was recognized as a crucial factor in the educational program based on the Forest Science and Engineering goals for human resource development. During the examination, teachers realized that "the objectives must also be understandable by students," which presented a new problem, namely the understandability of the objectives.

Table 5. The implementation structure for Program FD and its procedures

pre-evaluation	knowledge/ understanding		domain-specific skills			generic skills	attitude/ orientation
Name of courses	a	b	a	b	c	a	a
Forest Surveying	○						
Ecology and Manegement of Wildlife			○				
Satellite Practice for Agriculture and Forestry				○			
Practice for Sustainable Forest Management					○		

post-evaluation	knowledge/ understanding						domain-specific skills				generic skills						attitude/orientation				toatal
Name of courses	a	b	c	d	e	f	a	b	c	d	a	b	c	d	e	f	a	b	c	d	
English	30										70										100
Forest Surveying	30						30									30	10				100
Ecology and Manegement of Wildlife				20				60												20	100
Satellite Practice for Agriculture and Forestry					40				10			30							10	10	100
Practice for Sustainable Forest Management						10				30				20			10	10	10	10	100

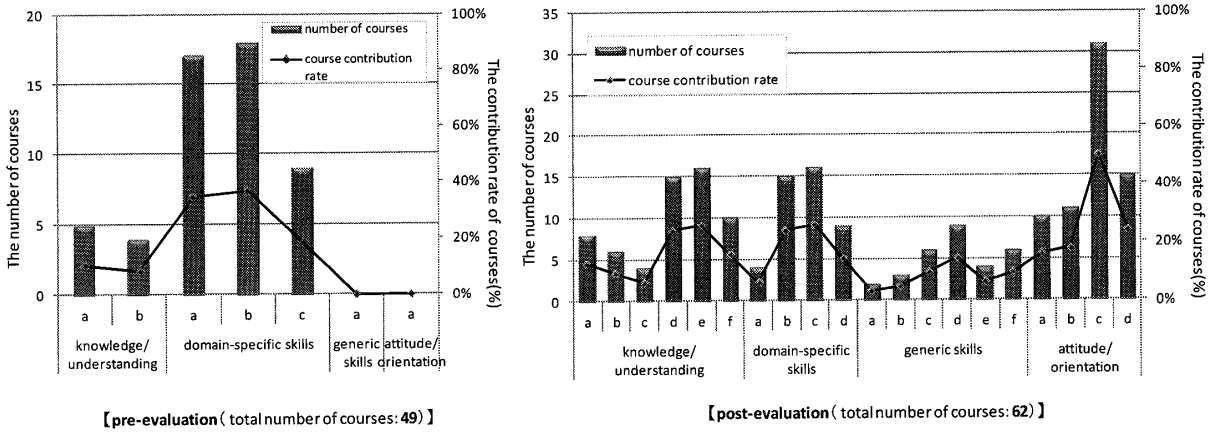

Fig. 2. The course allocation and the course contribution in pre-post evaluation (Forest Science and Engineering)

3.3. *Visualization of the Curriculum through Weighting*

We have so far individually assessed the pre- and post-evaluations of the two educational programs, but we have yet to discuss the entire study comprehensively. In this section, the meaning of "weighting" is discussed from the perspective of curriculum coherence in the educational programs.

In Living Sciences, the curriculum map was re-organized after a fundamental re-examination of the objectives based on the educational content and ratings of the individual courses. In Forest Science and Engineering, the objectives were examined in accordance with an external standard (JABEE), and the curriculum map was re-organized by confirming the course allocation and utilizing the external standard. In this way, the methods for re-organizing the curriculum map differed depending on the educational program's background. However, the point to note is how the weighting of all courses was conducted without differentiating between liberal arts and special subject courses. For example, a liberal arts course such as English (Table 4 and Table 5. Post-evaluation) is often taught by an instructor who is not affiliated with an educational program. For this reason, the academic staff found it difficult to weight such courses during the examination. However, since it was necessary to develop curriculum coherence within a common university-wide framework, weighting was conducted on all courses. Weighting of individual courses according to the objectives was conducted by the academic staff based on the educational program's goals, but this process was highly dependent on the experience of the instructors; the current problem thus resides in the lack of adequate reasoning. However, the essence of Program FD is to facilitate visualizing the curriculum coherence through the weighting of all courses.

Using the re-organized curriculum map, the percentage of the course value was calculated as follows: Σ (weighted value of the course corresponding to the objective) × (number of credits). By visualizing the educational programs' curriculum, an expanded framework thus became

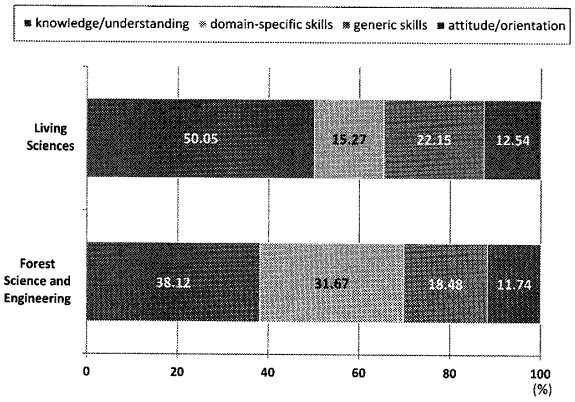

Fig. 3. Percentages in four educational target contribution

available, which opened up discussions across multiple disciplines (Fig. 3). However, although the educational targets are common across the university, individual programs set different objectives based on various criteria. Therefore, a simple comparison must be conducted with caution. Considering this, the visualization of the characteristics of the educational programs based on their targets may help facilitate the work of academic staff, as they are more aware of the educational programs' goals and objectives.

4. DISCUSSION

This study aimed to provide a practical assessment and evaluation of the functioning of Program FD, used to resolve the educational issues at Niigata University in an effort to promote undergraduate education. The Program FD implemented in this study is ongoing, which is expected to continue as long as the educational programs exist. A qualitative review is important for such practices, although a data based validation of its effects is difficult to conduct. Therefore, this article focuses on discussing the function of Program FD, and provides a perspective on future developments and the issues that have become apparent through this study.

4.1. Function of Program FD

Both educational programs examined in this study, despite using different methods for weighting, tentatively re-organized their curriculum map, and visualized the coherence of their curriculum. By employing the curriculum map as the common framework, each educational program discussed the content of its courses. In both programs, new issues came to light as a result of this discussion and evaluation process. For example, a common issue was the difficulty in positioning the educational target domain of "attitude/orientation." Further discussions are required in order to make the educational targets into objectives that are easily understood by both the academic staff and students. Moreover, further study is underway regarding the students' comprehension of the objectives revised by the academic staff.

The scope of this study's evaluation does not provide a clear outcome based on the detailed data of the implementation process of Program FD. However, the study has significantly enabled a framework to be developed in order to improve the education system of the university as a whole. More specifically, the objectives were set based on a common framework of four educational target domains at Niigata University, and all courses offered in the educational programs were examined and then weighted. By transforming this process into a curriculum map, it will function as a framework to enable the coherence of the curriculum to be visualized. Furthermore, this framework enables educational programs to be evaluated comparatively based on the educational targets, which serves as an opportunity to shift people's awareness towards an educational structure involving open discussions across different programs.

The practice reported in this study is an approach that assigns to individual instructors the function of sharing the purpose and coherence of the curriculum with other staff members, which avoids considering curriculums as simple collection of courses and thus ensures their coherence (Nanbu 2003). Therefore, the academic staff's examination of the curriculum systems functions by associating individual courses with the curriculum, with regard to the educational program's objectives and goals for human resource development.

4.2. Prospects for Program FD

From the perspective of curriculum coherence (Arimoto 2003), Program FD organically connects the aims of "quality assurance of the university's education as a whole" and the "quality assurance of the education in educational programs". In other words, it is an approach that comprehensively evaluates educational programs not only within their scope, but also within the context of the whole university. In this regard, the framework of such FD practices allows them to apply to any university. Given the current

situation where individual universities are expected to develop their own framework for quality assurances in undergraduate education, it is likely that a system will be required to enable the continuous reassessment of a university's educational goals. The framework enabling the visualization of the curriculum system as carried out in this study led to the reassessment of the course allocation in the programs as well as the content of courses. This enables the clarification of the learning outcomes that students should acquire, and thereby contributes to structuring a sequential educational curriculum (MEXT 2008).

The practice described in this study is still in its early stages, and is yet to be structured in order to explicitly show the direct outcomes on improving the actual educational content or rating methods. However, given this crucial transitional period in terms of the quality assurance in undergraduate education (MEXT 2012), it is assumed that it is necessary for individual universities to seek different approaches to improving their education system through a framework that intersects different groups at different levels: individual instructors, faculties and departments (academic staff), and the university as a whole (Bronfenbrenner 1979). Viewing university education from the perspective of system theory, discussions must be carried out within individual universities on how to converge universities' visions and goals, while flexibly absorbing the fluctuations in university education. Furthermore, a disregard for the individual situations of faculties and educational programs as well as the daily burden on instructors will not lead to the sustainability of this practice (Tanaka 2011). Within this study, while the Institution and educational programs cooperated in realizing the fundamental purpose of Program FD, namely the continued examination of objectives by the academic staff, the methods used were left to the discretion of the individual educational programs. For continued development in the future, it is important for the organization supporting the activities of the educational programs to accurately grasp the current situations affecting the programs and build a cooperative structure that does not pose an excessive burden on the academic staff. Therefore, for Program FD to function as a sustainable method for educational improvement, it must continue to employ approaches adapted to each situation. However, a methodology for such approach still needs to be established, such as the Participatory Action Research (McIntyre 2008), which could provide a framework for improving education by clarifying the individual roles of participants.

Program FD has yet to be conducted using an established approach, but the practice seems to have reached the stage where a common framework to promote curriculum reform in the university as a whole needs to be developed. The effects and evaluation of Program FD will need to be examined, particularly by establishing a methodology.

4.3. Future Directions

This study discussed the practice and function of Program FD. However, issues still remain regarding the framework of the practice and the methods used in its evaluation. From the perspective of sustainability and development as mentioned above, future directions may be summarized into the following three points.

The first task is to interpret and rate the weighted values of the courses in terms of the revised objectives. Program FD evaluates the objectives of individual courses based on found educational target domains in association with a curriculum map. All courses offered in the educational program were weighted, but the significance of these values must still be evaluated. At Niigata University, the abolition of conventional subject categories made these courses available to all students. Given this, in addition to encouraging academic staff to share the objectives, students must also be given access to the program syllabus as well as the visualized objectives and curriculum coherence (Oki *et al.* 2011). Therefore, as already has been carried out in some educational programs, it is necessary to construct a methodology to evaluate the objectives and weighted values. Assessing both academic staff's education practices based on the re-organized curriculum map and students' interpretation of these objectives will be required in order to promote this curriculum evaluation (Kinukawa 2006).

The second task is to determine the role of experts in the structure of Program FD. Program FD is an approach in which the academic staff takes the initiative, but it is difficult to apply a structure to evaluate the validity of the objectives and the integrity of the curriculum map from a professional perspective, such as pedagogy. For example, Yamaguchi University (Oki and Tanaka, 2006), which applied a policy of planning objectives based on systematic educational goals,

could be a useful reference. At the same time, although it is desirable to facilitate the shared awareness of academic staff by allocating individual courses in association with the curriculum, Program FD should not become a source of fatigue and have a sense of futility. Therefore, Program FD should not take away from the everyday educational activities of staff members, meaning that support systems should be provided (Tanaka 2011). To do so, the framework should be both practical and cooperative based on the common understanding of the staff members (Terasaki, 2006). The Institution should also act as a group of experts in its function. The development of an organizational system that maintains a flexible and organic relationship between the Institution and educational programs is thus desirable.

The third task is to reinforce the framework for sustaining and developing Program FD with the entire university in mind. Program FD examined in this study requires a framework that is larger than a few individuals, and its effect can only be recognized with the efforts of the entire academic staff. Consequently, promoting the reinforcement of this framework within the whole university will be an important task. Since all courses offered in educational programs are subject to weighting, Program FD requires an approach that takes into account the matrix of undergraduate sequences and scopes with the adequate cooperation of individual organizations within the university, regardless of the conventional division between liberal arts and special subject courses (Arimoto 2003). Good examples may be found in Hiroshima University's framework for evaluating objectives in educational programs (Hiroshima University 2008), and Ehime University's case of facilitating a university-wide education reform through the employment of an "educational coordinator" (Yanagisawa 2009). In addition, the measurement and evaluation of learning outcomes that were weighted based on the curriculum map are important tasks for the future. Niigata University began developing the Niigata University Bachelor Assessment System (NBAS) in the 2010 academic year (Ikuta *et al.* 2011; Ikuta *et al.* 2011). This system utilizes the curriculum map re-organized in Program FD, and thus allows the university to visualize students' learning outcomes and for students to grasp their own attainment level. The NBAS could potentially serve as a tool for evaluating the curriculum coherence.

ACKNOWLEDGEMENTS

This study was funded by Ministry of Education, Culture, Sports, Science, and Technology's "Grants for Operating Expenses Special Expenditure (for the 2010-2014 Academic year)" for the project. We gratefully acknowledge the cooperation for the academic staff in Living Sciences Program and Forest Science and Engineering Program in this study.

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