Learners General Quality Attributes within Courseware Design

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Abstract. here is a real need in the higher education sector to define and develop Learners General Quality Attributes (LGQA) that students should attain prior to their degree completion. These LGQA should be embedded within courseware design in a way to assure their effectiveness. Attaining these attributes by students is a crucial in the organizational environment and might be at the same level of importance as attaining degree's specific knowledge. It is common to read in a job advertisement terms such as, "a candidate need to have a great communication skills", "we are looking for a team player", "has creative thinking skills", etc.

1 Introduction

The learning opportunities provided by E-Learning technologies are encouraging universities to systematically invest in them to enhance the student experience. This trend has generated a renewed interest in evaluating effective instructional learning designs [2]. The quality improvement has driven researchers to study how to scientifically measure students' learning outcomes [5]. In addition, today's knowledge-based economies are looking for people who can think critically and strategically to solve problems [7]. Learners General Quality Attributes (LGQA) are something the organizational sector is looking for when employing new graduates. Many researchers have indicated that activity-based learning could generate a rich environment for enhancing these graduate attributes [6]. Identifying and evaluating LGQA within courses is not easy to achieve. The subjective nature of such attributes makes it difficult to assess. Currently, there have been a couple of approaches to identify and evaluate LGQA embedded in courses. The first approach is evaluating learners' own perceptions on what types of LGQA they think the course has. The second approach is consulting course designers on what types of LGQA they think their course enhances. The limitation of these approaches is that there might be a gap between what designers hope and what actually happens [6]. It is more ideally to rely on more than one approach to provide such evaluation. A collaborative effort is needed by different stakeholders (teachers, students, faculty administrator, organizational managements, etc) to perform such evaluation in more precise manner. Also it is important to define a general LGQA development process that includes specific steps with identifiable outputs. Similar to other general process, it should include answers to key questions, such as:

- Goals (which)

- Steps (what)

- Deliverables (what)

- Techniques (how)

- Roles (who)

Table1 presents the elements of such process. The instructional designer of a course needs to have in his mind what type of LGQA he needs to emphasize in his course such as, oral/written communication skills, higher thinking skills, social interaction skills, etc. Four main steps in this process are related to four key actors (instructor, quality assurance reviewer, faculty administrator, and student). As a starting point, it is important to identify these attributes early during course designing. Then there is a need to provide realistic evidence that such course design will facilitate attaining such attributes. This is simply done by requiring learning designers to map specific learning activities included in his course to a specific set of LGQA. Then a validation stage is needed to verify the LGQA achievement. Two main activities are used to perform this. First, an independent quality assurance reviewer can be assigned to inspect that mapping. Second, for additional verification, a student's questionnaire can be used at the end of the semester. Finally, various reports can be obtained showing the status of LGQA levels regarding students, courses, and schools along with their related progress over the time. Specific techniques can be used within these steps. For instance, Brainstorming can be used by instructional designers or more widely by stakeholders to identify the desired LGQA. Interviews and questionnaires can be used to collect students' feedback during the validation stage. Walkthrough can be also used to inspect the LGQA mapping by the reviewer.

Question	Items
Key Question:	Which Graduate Quality Attributes are desired to be achieved in this learning module?
Deliverables	LGQA requirements LGQA attaining reports
Steps	1.Defining desired LGQA 2.LGQA Learning Activities mapping 3.LGQA validating 4.LGQA reporting
Techniques	Brainstorming Interviewing Questionnaire Walkthrough
Roles	Instructional Designer Learner QA reviewer Faculty Administrator

Table 1: LGQA process

LGQA process is an iterative process (shown in Figure 1). It is not a strict straightforward process with no ability to return backward. Instructional designer can return to the "LGQA Defining" step during the mapping stage, if for instance he finds out that some of learning activities are missing. In other hand, if students' feedback results were not as expected, instructional designer can return back and redesign these activities to enhance these attributes. Reporting is an essential component that enables faculty administrators to perform their analysis and provides a proper level of guidance for instructors to add or enhance specific LGQA in their courses
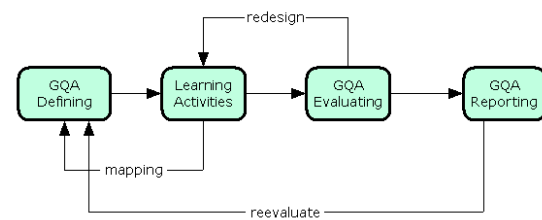

Figure 1: LGQA process

2 Learning Activities and LGQA

The first page must contain, in the following sequence: Learning, which has historically been concerned with social and intellectual development [1], is currently introducing and encouraging activity-based learning [3]. Many researchers are predicting that learning will be seen as more socially shared, active, and interactive than in the past [1]. A set of collaboration activities has been widely used in various course designs. A literature review on the various activities that have been used in classrooms shows that there are more than 100 techniques [4, 8, 9]. We have analyzed some of these techniques, that are popular within the teaching community, to identify what types of LGQA are embedded within. The techniques that we analyzed were: Informal Group Discussion, Round Table Discussion, Brainstorming, Group Nomination, Debate, Jigsaw, Pro/Contra, Think Pair Share, Pyramid, Buzz Group, Role Play, Case Study, and Team Pair Solo. The internal structures of these learning activity techniques are carefully analyzed. For example, the Debate technique usually enhances critical thinking skills, while Brainstorming enhances creative thinking skills[1]. In the following example we present the internal structure of the Group Nomination technique and how it could be systematically mapped to certain LGQA. This learning activity technique is an evolved version of the Brainstorming technique. This technique is ideal for decision-making for a certain topic or problem without a specific solution whose resolution implies not only creating ideas or solutions, but also choosing the best idea. The Group

Nomination technique procedure:

- 1. Posting ideas, no criticism or elaboration is allowed in this step.

- 2. Discussing posted ideas to obtain clarification and evaluation.

- 3. Idea-prioritizing, each participant is asked to assign a mark for each idea.

- 4. Idea-reporting, reporting the highest idea to other groups (done by chairperson).

In the following table, Table2, we have identified six Learners General quality attributes related to the Group Nomination Technique.

LGQA	Step
Creative thinking	1- Ideas Posting
Analytical thinking	2- Ideas Discussion
Reflecting	3- Ideas Voting
Decision-making	4- Idea Selection
Time management Team Knowledge sharing Leadership	General

Table 2: the graduate quality attributes related to Group Nomination Technique

In addition, we have analyzed the entire set of syllabuses within our faculty (Information Technology Faculty) to identify what type of assignments and activities that they have. We have managed to identify 10 common types of LGQA that are shown in Table 2. These results can be used in defining a template that suggests what type of LGQA a course might has according to the activities that it includes.

A further work is needed to be done in this field by researchers to identify and standardize a wider range of attributes that could be used within specialized tools to support instructors in implementing such approach

3 WORTHY

WORTHY is a web application tool that has been built by our group to be applied in our faculty starting from the next semester. The main objective is to increase the awareness among our colleagues of the importance of LGQA. WORTHY has been built according to the process specified in this paper. WORTHY is successfully integrated with the LMS used in our university. An entry point for mapping LGQA in WORTHY is through

| LGQA	Examples found in the syllabus
Oral Communication	Presentation, Group Discussion
Written Communication	Document based assignments
Creative Thinking	Brainstorming, Case Study
Critical Thinking	Debating and negotiating group based activity
Reflective Thinking	Reviewing articles
Leadership	Group based with a leader based assignments
Searching ability	Assignment that require information searching
Decision Making	Group based assignments with multiple solutions
Time Management	Timed based projects
Team Knowledge Sharing	Group discussion, group based tasks

Table 3: The 10 common tasks in LGQA
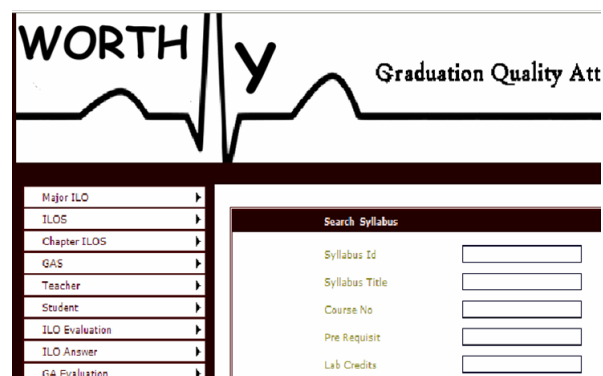
Figure 2: Worthy Screenshot

the syllabus page. During the construction of the syllabus, the system enables an instructor to link any activity component (in the assignment column) to the 10 predefined LGQA that are shown in Table 3. In addition, instructor can define an extra LGQA by selecting a "non from the above" option. As soon as the instructor selects one of the LGQA types, the system will inquire him to include a factor scale representing the weight of that LGQA within the linked activity. Still the instructor can have the option to relate more than one attribute to a single activity. A detailed use case for relating LGQA to a syllabus is shown in Table 3.

For implementing the LGQA verification phase, WORTHY provides two main components. First it enables LGQA reviewers to validate the instructor's LGQA/Activity mapping. In case of conflicts, the system notifies related stakeholders about these conflicts. For example, a

UseCase	RelatingLGQA
Actors	Instructor
Precondition	" An instructor logged into the system " A valid syllabus needed to be related to LGQA
Success End condition	The instructor has successfully mapped several syllabus components to LGQA.
Main Flow	1. The instructor chooses the desired syllabus 2. On the assignment column, the instructor clicks on the activity that he need to link 3. The system presents a separate window that contains all LGQA 4. The instructor ticks the related LGQA checkbox 5. The system inquires instructor to include a factor scale representing the weight of the mapped LGQA 6. The system presents the selected activity along with its mapped LGQA 7. The instructor confirms it by clicking on a confirm button 8. For mapping more activities on the syllabus, instructor repeats step 2-6
Alternative Flow	4-a if no desired LGQA found in the list 4-a-1 The instructor ticks "non of the above" option 4-a-2 The system shows a new window that contain empty LGQA fields 4-a-3 The instructor fills in all information related to that new LGQA

Table 4: Relating LGQA Use Case

group meeting between the instructor and the reviewer could be done to clear up these mapping conflicts. Second, WORTHY automatically generates an online questionnaire following the course completion. This questionnaire is based on the LGQA included in the syllabus. Each LGQA is mapped to a predefined question where students in that course are asked to answer. These questions may be closed and/or open type questions. The closed questions are 1-5 scale-based questions. These questions are defined by learning designers at an earlier stage. They are defined according to a general type of questions. For example, the "Oral Communication Skill" LGQA can be mapped to this questionnaire's question, "After completing this course, I feel now more confident when I am presenting in front of a group". All questions are stored in a repository in which the system can access to generate the appropriate questionnaire. WORTHY has also an instant graphical-based reporting. It enables various stakeholders to generate reports according to different level of usage. For instance, students can view a detailed report containing all activities that they performed during their study. They can also view their LGQA levels. In addition, they can get a separate view that compares their LGQA level

to the average student's level. Instructor can view a report that contains students' feedback results. Faculty administrator can access course LGQA reports to compare courses' level with the previous years' level. A higher level of management has the ability to compare different schools' levels and their progress during the years.

4 Conclusion

The main objective behind this research was to built a system that enables both student and instructor to participate effectively in the process of developing educational activates in way to achieve important graduate qualities. These quality attributes are well known in the organizational sector. In relevant literature they have been called by terms such as, "Graduate Attributes", "21st Century attributes", etc. Identifying and enhancing such attributes is both a critical and challenging. It needs a collaboration and commitment from all stakeholders to achieve this objective. We have implemented a tool "WORTHY" as a proof of concept. This tool will be deployed next semester within our faculty (Information Technology faculty). In addition, an evaluation study will be conducted to verify our goals and objectives. We are planning to publish the results of that study probably after a couple of years from the deployment of WORTHY. Currently we are gathering data throughout questionnaires and interviews to use it as a baseline data to compare it against the future data

5 Acknowledgement r

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