

Process of Curriculum Improvement for Information and Communication Technology (ICT)

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Abstract— As the world is ever changing towards globalization, and as the technology is changing rapidly especially in the field of Information & Communication Technology (ICT), there is a need for reflecting and updating ICT curriculum. In this paper, we will outline the various processes required for developing a successful first year ICT curriculum. In the construction of the curriculum, the needs assessment, the situational analysis carried out, including the nature of the students, design of the learning experience, cultural and social changes are discussed. This curriculum objective is to prepare our students for learning-for-life. We believe that the main obstacle for proper implementation of this new curriculum is the mastery of the English Language by our students: we outline some guidelines and procedures on how to overcome this obstacle. Samples of the various products used and designed in the new curriculum development process, such as the contents of the curriculum and the evaluation process are discussed.

Keywords- ICT; Curriculum; Learning-for-life.

I. INTRODUCTION

The purpose of this project is to guide our students towards learning-for- life skills. Considering the fact that our students come fresh from secondary schools where the language of instruction is Arabic, while the curriculum in the college uses the *English Language* as the mean of instruction. In addition there is still a need to apply a range of teaching-learning strategies in order to get the material across. The concern is the language barrier and the need to find ways to deliver the program. For instance, how to tackle the issue of teaching ICT vocabulary using learning strategies?

The orientation of the students is that on completing their ICT courses in our department, the students join other colleges in the university. Because of this, in the curriculum emphasis will be given to liberal progressive orientation [5], where we emphasize teaching strategies towards learning-for-life. Initially, our students do not have problem solving

skills and hence we need to emphasize on Problem Based Learning (PBL), so that the students will be able to face future challenges. PBL is an instructional method that challenges students to "learn to learn," working cooperatively in groups to seek solutions to real world problems. This should be done in collaboration with other departments, for example to ask the students to do a collaborative project involving Mathematics and ICT.

II. SITUATIONAL ANALYSIS

Print in [8] suggests that situational analysis is an obvious commencement point for the construction of a curriculum. Above all, it is an opportunity for curriculum developers to take into account local factors when developing curriculum to meet students' needs. In this situational analysis we wanted to analyze the context that the curriculum should be and then use it to help in our planning. We will present the situational analysis in the order presented by Print in [8].

A. The problem

The problem that initiates the situational analysis is to: Devise a curriculum to teach a couple of thousands of first year university students about using computers effectively such as Microsoft Office.

B. Factors

Several factors, both external and internal affect the assessment of the curriculum. These were cultural and social changes, educational system requirements, changing nature of content, teacher support, resources, teachers and perceived problems.

Cultural and social changes: Major changes occurred in the UAE recently, more places of businesses and employment need nationals to replace foreigners, who dominate over eighty percent of the workforce. For example Dubai e-government program needs ICT professionals who understand the culture and can work in an environment that uses *English* as the main *Language* of communications. Also the community thinks if you study ICT, then you are expected to know many things about computing, hence the need to teach our students what they will apply outside the classroom.

Education requirements: Because the Foundation Unit is like a service department, we have to go by the requests of the various colleges of our university. Also there are systematic influences like prerequisites for those students going to new IT College and external examinations such as International Computer Driving License (ICDL), Internet and Computing Core Course (IC3), and Microsoft Office Specialist (MOS). The students need to use the knowledge of what we teach them in their future studies, for instance, in the preparation of assignments and projects.

Changing nature of content: The changing nature of new programs and tools requires changing our curriculum. For instance, one of the e-learning programs we want to use in our classroom requires an updated operating system. Our curriculum has to go with the current trend otherwise our students would be outdated.

Resources: There are enough resources to implement the curriculum, the classes are well setup, and each student has his/her computer. These computers are well maintained by computing personnel. We use visual teaching aids, such as blackboard, WebCT, data shows and broadcast facilities in each classroom.

C. Data collection and analysis

After each semester, we assess the situation and find out advantages and disadvantages of what we have done and what could be changed. We have the results of students' evaluation of teachers for each semester. We also have the coordinators' feedback about our teaching, regarding what they observe in our classes during class visitation. Moreover, a study was conducted on the teaching of *English Language* in secondary schools, including the profile of teachers, the number of contact hours and the material used. Based on these results we will try to address and improve on the negative points raised by the students and the coordinators.

D. Make recommendations

Our students require substantial literacy development to establish secure English communication skills. The recommendations based on our experience and discussion with experts and the mission of our department is to develop a program that will serve our English as second language learners' needs, using a range of teaching styles and materials like e-learning.

III. NEEDS ASSESSMENT

In order to determine and rank the needs of the students, we perform the following assessment needs for the curriculum development based on the discourses and the sequence in [8].

A. Formulate goals

Goal 1: Students should relate Information Technology to everyday life.

Goal 2: Students should have adequate access to software/hardware and also be able to work collaboratively.

Goal 3: Students should be literate in English at an acceptable level.

Goal 4: Students must respect the country's cultural and political environment.

B. Rate/Rank goal statements

We rate/rank our goal statement using the dominant (>) order from the most to least importance, Goal 1 > Goal 3 > Goal 2 > Goal 4.

C. Determine goal statements

Based on our experience of teaching ICT in this department and the results of course evaluation by teachers and students, the students' evaluation of teachers, and examinations results from past years. We compared the results we obtained to what we envision and would like to happen. We consider each goal separately, thus:

Goal 1: We feel that this goal has high discrepancy, because in the past years we use to teach tools only. For instance, in word processing we teach how to format a document, without explaining what is the purpose of formatting the document. In the planned curriculum, we want our students to learn the reason of the action.

Goal 2: This goal has high discrepancy, because access to software/hardware is very important. We are still in need of more practice laboratories for students to work during the day and in various hostels.

Goal 3: Based on all of the above, it appears that there is negligible discrepancy for this goal. Our students must pass placements examinations before joining our department. Even though the placement examination is mainly multiple choices, there is a slim chance that any student will pass the examination without reaching the desired level of English ability. From experience, we estimated that there would be about 10 percent of the class whose level of English is below the required standard.

Goal 4: We think that this goal has negligible discrepancy also, in the sense that the government and the university authorities regulate the norms and the cultural aspects. Hardly will anyone think of going against them, for instance, having separate campuses for male and female students. Most people think that this best fits our learning situation.

D. Developing plans of action

In our ranking, we gave Goals 1 and 2 negligible discrepancy factors because these goals are control by the University General requirements Unit (UGRU) management

and most people adhere to them. But because of the importance of Goal 1, and in order to achieve part of the curriculum purpose, we still need to focus on it. When teaching we will try to speak slowly using simple English, will review the previous lesson and also summarize the current lesson. This will give the late comers the opportunity to grab whatever they might have missed. We would also suggest pairing well with poor English students, and having the former help the latter, or use them to explain essential technical terms in *Arabic*. Goal 3 is our main purpose of our curriculum change. Our immediate plan of action is to use several scenarios and tasks in the classroom, for students to see how Information Technology is related to everyday life. For example, in the teaching of PowerPoint, we can devise a scenario that "Present a seminar about Dubai for new students". From the scenario the students are tasked to go to the Internet and search for information about Dubai, so that they can complete the presentation. Goal 4 has moderate discrepancy factor, because this is something to do with culture, and it is difficult to change it that quickly. We will however try to make our lesson interesting, and involve students in tasks that will make it attractive to them to take an active role in the university and community life.

IV. CURRICULUM CONCERN

As indicated earlier in the introduction, the aim of writing our curriculum is about how to tailor the learning situation of our students towards learning-for-life skills, that is, to teach our students how to apply information technology to everyday life. However, our concern about achieving this purpose is the poor background of our students in the *English Language*. The concern arose because most of our students were taught in Arabic in Secondary schools and we are asked to teach them in English. So we need to find ways to improve the teaching-learning situation in the context of the learners' needs.

In [5] the authors suggest three orientations to curriculum; vocational/neo-classical orientation, liberal/progressive orientation, and socially-critical orientation. Our curriculum involves two orientations; liberal/progressive and vocational/neo-classical orientation. This is because the curriculum will not only focus on education as a preparation for life rather than work, but will also see education as preparation for work [5]. However, in the curriculum emphasis will be given to liberal/progressive orientation, the reason being, we want to emphasize our teaching towards learning-for-life. Even though some of our students graduate, and decide to just sit at home without seeking any form of employment, we do not want our students to come to university just pass exams and get a certificate, without learning the skills they will need to apply in their everyday lives.

For instance, we need to explain to the students that, we are teaching them PowerPoint in order to prepare and make presentations about any topic in their further studies or in their workplace, when they graduate from the university. The knowledge can also be used to make presentations to community groups or clubs.

Coming back to the curriculum issue, we begin by summarizing our views about this issue. The reason why we choose it is because this is an issue which is gaining attention throughout the Middle East region, where all instructions in the fields of business, science, engineering and medicine are in English. So many conferences and workshops have been taking place in the region about this issue, for instance, Teaching ICT and Learning Strategies to UAE Students workshop conducted by a well-known authority on language learning strategies, Dr. Rebecca Oxford. In [10], Tharp & Gallimore suggest that, real teaching is understood as assisting the learner performs just beyond his or her current capacity. Since each of the students has a computer, we will encourage them to use online dictionaries, and special ICT terminologies dictionary available in the computer system. Also, in the lesson, we will use data show and broadcasting facilities to engage all the students. We will also use computer games and puzzles related to the topic, so that the students can understand the lesson in an enjoyable manner. Since there are ranges of places where students can get help, we will refer the students especially the weak ones, for instance, to writing center, tutorial center and independent learning center. A writing center is a place where students can get help with writing their assignments and their projects, while the independent learning center is where students can have access to worksheets, past examination questions, magazines, books and translation facilities. Both centers have permanent staff and are maintained by the Communication department, which is having more than one hundred and fifty English teachers. Our department collaborates with the communication department in order to help achieved the English as second language learners' needs. Moreover, if there is any student who needs further help, we refer the student to peer tutoring center, where the student can learn from older and more experienced students.

Having said a lot on how to ensure that the students' needs are met, it is worth mentioning that, there are some difficulties on the way of achieving our purpose. For instance, once the students leave the classroom, they tend to forget about using English anymore, even though UGRU management emphasized that English should be the medium of communication anywhere on the campus. We hope that by the end of this project, we will learn more about the students' needs, and will see a difference in the students themselves when we come to implement this newly developed curriculum.

V. PROGRAM RATIONALE/AIMS

The rationale and aims of the program we want to develop must support the mission and vision of our unit, the UGRU which is publicly available. The overall primary mission statement is: To enable UGRU students to become successful through participation in an exemplary developmental program as preparation for their life in the university and the society. It can be seen that the mission is comprehensive in the sense that, it is concerned with providing basic education in ICT, in order to meet the requirements of the schools in which our students are going to join and the needs of the society at large after graduation from the university.

The rationales behind the new curriculum that we want to develop are:

- Consistency with UGRU mission.
- Increasing number of students possessing competencies covered in present curriculum.
- Make the curriculum more academic.

The new curriculum emphasizes the need of students to think logically and to apply what they learned to their daily lives. It can be seen that the first few weeks of the course outline concentrate on how to help students develop certain skills and attitudes that are important in any academic subject and in the work after university studies. Hence, considering the above aims could be summarized as follows that our students should be:

- proactive thinkers
- critical thinkers
- problem solvers
- capable of self-assessment
- self-sufficient and self-motivated
- able to find and use appropriate resources
- technologically advanced
- leaders as well as team players
- capable of communicating ideas and listening to others

VI. INFLUENCE ON CURRICULUM

Any curriculum development process is influenced and shaped from many angles. Our PowerPoint presentation curriculum in the ICT 1 course is no exception, and these include in the order of stronger influence UGRU management, lecturers, society, environment, the colleges to which our students will join, and the students themselves. In his Humpty paper, [15] suggests that, there are many different types of influences on the curriculum, some of which will be more obvious and direct than others, and one

cannot think of a curriculum design, implementation or evaluation without taking them into account.

Because our university is the first one of the few Federal Government higher institutions in the UAE, and taking into consideration the cultural settings, any decision on curriculum design has to be done with caution. In order to meet the needs of the schools that would absorb our students, UGRU consults with the colleges in drawing up the curriculum. Coupled with the belief that IT skills are critical to the country's economic, along with rapid economic and technological innovation changes, for instance Dubai e-government program, being seen in this country, means that the curriculum must meet these diverse needs.

VII. CURRICULUM DEVELOPMENT PROCESS

Curriculum development needs to draw upon analysis of society and culture, studies of the learner and learning process, and analyses of the nature of knowledge in order to determine the purposes of the school and the nature of the curriculum. This appears to describe my aims and objectives of designing the program, taking consideration of the mentioned factors. The situational analysis and needs assessments conducted revealed the need to develop an ICT program which emphasizes the adoption of the concept of learning for life-for-life skills.

Although lecturers at UGRU are guided by UGRU management on what to teach, they have their own ideas on how best to deliver the materials in line with the needs of the students. For example our students being fresh from secondary schools have little knowledge and experience about the importance of problem based learning, which they need to apply when they pursue their further studies in various colleges after passing out from UGRU. Problem Based Learning (PBL) helps students to apply the knowledge that students learn in UGRU to real world situations. It helps make connections between theory in the classroom and real life outside. This is where lecturers will use their experience to develop activities to help the students understand the importance of developmental skills like:

- Working in a group
- Working on your own
- Setting goals
- Checking progress
- Meeting deadlines
- Asking useful questions
- Generating and evaluating ideas
- Making and supporting decisions and predictions
- Finding the information that a student needs

- Using information ethically
- Communicating effectively

Our curriculum development planning encompasses a combination of Tyler's four activities and action research. [3] mentioned that, Action Research is a form of collective self-reflective inquiry undertaken by participants in social situations in order to improve the rationality and justice of their own social or educational practices, as well as their understanding of these practices and the situations in which these practices are carried out. Here, we want improve our educational practices in which the principal participants are UGRU management and the teachers. Due to the dynamic nature of the curriculum, the participants will be watching any changes of the curriculum. For instance, should the *English Language* ability of the incoming students improve or a new Computer software be introduced, then the objectives or planned activities might need to be changed.

VIII. DESIGNING THE LEARNING EXPERIENCES

We believe that the design of the learning experiences is the most important aspect of the any curriculum, not only because there is always what might have been included in the program or have been left out for various reasons, but because we have to take into consideration the implicit curriculum. [15] stated that:

“The implicit curriculum is learning that occurs without having been directly and intentionally planned, taught or learned. It consists of various messages the meanings of which are inferred and subconsciously absorbed by learners and teachers. What is learned of the implicit curriculum forms a ‘naturalized’, unchallenged and taken-for-granted view of the world”.

As pointed out earlier, the choice of syllabus and the different collaborative activities to be learned by the students are governed by different factors, such as cultural, organizational or time framework. For example, due to the cultural norms, the teacher has to be cautious about the choice of words, types of examples to be given, and even the pictures to be displayed while making a presentation in class.

No curriculum development process is complete without taking consideration the issue of student's outcome statements. Tripp stated that – An outcome is a demonstration of learning which occurs at the end of a learning experience or experiences. Our program will utilize Student Outcome Statements in terms of output we see from students not input from teachers [12]. The Student Outcome Statements are given in the form of the following procedures.

Our students should be proficient in three proficiencies:

- **Cognitive Proficiency** – Foundational Skills of everyday life at school, at home and at work involving literacy and problem solving.
- **Technical Proficiency** - Includes a foundational knowledge of hardware, software applications, networks and elements of digital technology.
- **ICT Proficiency** – The integration and application of cognitive and technical skills.

1. Identify the applicable program content design to meet the program objectives and desired students outcome. At this stage I have to ensure that the program content provides details of conceptual framework in order for students to understand the relevant concepts, principles and skills as outlined in the mission statement.
2. Identify the learning experiences which will enable students to acquire the relevant skills, concepts and attitudes. In order to achieve this, variety of teaching and learning strategies need to be employed. Our students need to know how to access information, manage information, evaluate information, interpret and represent information. In order to achieve all of these, there is a need to have adequate resources, like computers, data shows, broadcasting facilities, etc.

We need to decide what will be assessed and how the students will be assessed. Due to the nature of our department where we have so many students, for instance two thousands students taking one course at a time, about 65% of our assessment is controlled by the curriculum coordinator and is normally conducted using computer and the results being automatically uploaded in the grading system. Even the remaining 35% which is in the hands of the teacher is restricted to Quizzes (timed-tasks) and Project (non-timed tasks). Based on our experience, we will be comfortable to adopt the above system of assessment when it comes to implementation of this new curriculum.

IX. IMPLEMENTATION PROCEDURE

One of the problems of implementing a program like ours is how to implement it without going outside the borders of the core competencies and objectives of the program. In [13], Tripp suggests that, the role of the school is to provide a service to the community who are its clients. So it is primarily the responsibility of the school to accommodate the child's nature. Our students come to us fresh from secondary schools with different cultural and academic backgrounds. For instance, they are very shy to participate in group work. Also our students do not have the

habit of reading and reflecting about what they read. One of the ways to tackle these kinds of difficulties is to give them tasks step-by-step, finish one task before going to the next. Since our students pass through UGRU, they go to their various colleges, graduate and seek different jobs, our curriculum will include how to tackle complaints raised by employers stated as follows:

- Graduate's poor written and verbal skills
- Graduate's inability to solve problems
- Graduate having difficulties working collaboratively with other professionals

McKay [6] argued that, the role of educator is not just to transfer skills, but to inspire in students a spirit of inquiry. This is exactly what we want inspire in our students. Our program will be mainly task based, where the students will be given the chance to make inquiries using different teaching/learning strategies, tools and materials, for instance using computers to gather information and present it in a sensible way.

Based on our experience, our students will not participate in exercise or group work without assessment. In fact they will not even attend classes without assessment, that is why we have attendance policy in place, in which if a student misses 15% of the total hours of a course, the student is considered to be withdrawn from the course. The course outline of ICT1 provides the details plan of our assessments. The implementation of these procedures benefits the students in the following ways.

- As adults it encourages the students to become more responsible for their own learning.
- It provides a form of discipline in meeting deadlines, which is very important in their further studies and their life in general.
- It encourages sharing of responsibilities and enhances group learning.
- It helps the shy students to become more involve because they can talk with their peers and work together.
- It helps the weak students to develop self-confidence.
- It somehow solves the problem of language barrier, because the students can talk in their own language.
- It is important to reflect on some of the implementation difficulties and challenges. These can be related to students, teachers or administration and can include logistics problems. Since greater part of the implementation of the program involves group working, there is the issue

of criteria for making teams, for instance can the administration provide the teachers with past grades of students so that teachers can have mixed ability groups? Also since our teaching is largely based on the use of computers, can the teachers have reliable system support from computer services personnel?

To summarize this section, we will implement our proposed curriculum via the following:

1. The use of constructivist method of teaching where the teacher act as facilitator
2. The use of collaborative exercises using tasks and scenarios
3. The use of non-timed tasks in a form of project.

X. EVALUATION OF THE PROPOSED CURRICULUM

It is important to develop appropriate strategies of evaluation throughout the course of a curriculum in practice. This is because evaluation determines the extent to which appropriate outcomes and course objectives are met, serves as instrument to improve or revise the curriculum and to provide feedback to teachers on how effective is the curriculum.

Out of the four broad strategies for curriculum evaluation [4], our evaluation will largely be based on student-centered evaluation, which [4] argued that, it favors participation by teachers. We believe that, for evaluating the effectiveness of any instructional plan, teachers play an important role. Our department has the culture of evaluating each course towards the end of the semester. The evaluation of the course is done by both teachers and students, and I see it as important, because the students and the teachers are the dominant participants in putting any instructional plan into practice. We will therefore adopt the Course Evaluation by Teachers and Course Evaluation by Students throughout the implementation of the proposed plan. The details of these evaluations may be discussed in future research papers about this topic.

As a test of new strategy different from the norms of our department, we will also adopt the Table of Inventions designed by Schwab as described in [4]. This is because it takes into consideration all the areas in the learning and teaching situations. Moreover it provides easier methods of evaluating them. Finally, in addition to the evaluation by teachers, evaluation by students and the table of inventions, we will still encourage teachers to keep journal entries of any concern or dilemmas encountered during the implementation of this new proposed plan

XI. CONCLUSIONS

In this paper, we presented a new developed curriculum for ICT students in the foundation program of the UAE University.

One of the benefits of this paper was to describe the challenges we faced. In the studies of Strategies for Curriculum Evaluation in [4], Khemmis & Stake argued that, although a curriculum will obviously include much that is either remote in time or abstract in character, abstract formalism cannot be the main character of a common curriculum. A combination of doing and reflecting on the doing is more likely to make learning accessible to the largest possible range of students. Throughout the design of the project, we have consistently addressed the curriculum concern and the issues that have informed our task. We believe that, curriculum should be practical and doable, and hope to have a smooth implementation of the curriculum. In the construction of the curriculum, we tried to meet the needs of the students as stated in the situational analysis and needs assessment. We believe that by properly implementing this new curriculum, our students will become better during their college studies as well as become better citizens who will contribute constructively into our society.

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