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Implementing IS'95: A Case Study

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If an institution plans to revise its IS curriculum, it should not merely adapt its present curriculum by changing some components to be more in line with standards such as IS'95, or include new components because it seems that the designers of IS'95 thought a respectable IS curriculum should include them. Without appropriating and internalizing the curriculum proposals, an institution cannot hope to be successful in redesigning its curriculum. The only result would be a patchwork of components which somehow reflects the idiosyncrasies of the educators, and does not necessarily address the real needs of students hoping to be prepared through the curriculum for a career in information systems.

Planning a curriculum and revising an existing curriculum should be seen as a formal process which requires a lot of input and hard work to be effective and useful. In order to guide our own activities in this regard, we developed a generic framework for curriculum planning and improvement and described a structured process to apply the framework (Froneman and Roode, 1996). The structured approach ensured an internalization and appropriation process.

At the heart of the structured approach is a double loop learning process. We hypothesize that a curriculum is usually based on a formal or informal conceptualization of the total program, or components of it. In formalizing such conceptualizations, an institution will wittingly or unwittingly make certain assumptions and set certain norms for its programs, reflecting local beliefs and making provision for local conditions. Assumptions and norms play a determining role in that the program requirements, curriculum, course requirements and teaching methods are logically derived from them. This does not mean that the program and curriculum are fixed once the assumptions and norms are laid down - they can indeed be incrementally changed based on the results of student performance, which is part of the single loop learning process. The more important double loop learning is imbedded in the questioning of assumptions and norms, using the results of external assessment and alumni/employer survey information.

The structured approach which we followed to revise our IS curriculum consisted of the following phases, which were not necessarily executed sequentially.

Phase A: Determine the assumptions and norms implicitly or explicitly used in designing the present program

Some assumptions and norms would have been made clearly and explicitly. Yet, it might require a major effort to find and identify them. Other assumptions might have to be uncovered through a backtracking process, starting with current components. This could bring to light hidden assumptions which were never made explicit, and "unwarranted"

components which just "happen to be" in the program without ever being formally planned to be there (e.g., because the ability to teach that components was readily available). Before reconsidering these assumptions, it is necessary to ascertain on what grounds they were based. Myths, being part of the folklore of the institution or the faculty, could play a major role and would often need serious efforts to bring them and their influence to light.

This part of the process was undertaken by the Department as a whole, with all faculty involved in open discussion sessions. We had some assumptions and norms which we formulated nearly five years ago, of which perhaps the most important and influential were: "We believe that systems are built by people for people", and "Feedback loops with control are basic elements of information systems". The more arduous part was to backtrack from our present curriculum to discover the assumptions and norms we made along the way. We eventually had 34 assumptions and 11 norms. Amongst these were the following assumption: "We can improve the problem solving ability of a student", and a corresponding norm: "Graduates must possess an independent problem solving ability".

Phase B: Ascertain how assumptions and norms influenced the present program

Knowing what went into the curriculum building process does not necessarily mean that one knows how this led to the present program. It is also not necessary to reconstruct the process: the objective should rather be to attempt to understand in what way the assumptions and norms have had an impact on the current program. A curriculum, built and shaped over years, is a complex web of interrelated elements, and careless removal of some of them might bring the whole structure down.

Certain of the assumptions and norms we identified during Phase A were shown to be hollow statements in that they had relatively little or no influence on the curriculum; others were major determining forces.

Phase C: Conduct alumni and employer survey, and/or external assessments

External assessment could be done:

- By peer evaluation as part of an accreditation scheme
- By senior staff from businesses with which the institution has formed a partnership or alliance, against internal or external standards
- Through self-evaluation against external standards, such as IS'95.

Alumni and employer surveys are important ways of obtaining unbiased information about the competencies and skills expected of graduates. Several such surveys, reported in the literature, can be used as models.

We undertook an investigation to determine the skills and competencies employers require of our IS graduates. The results were reported elsewhere. One of the more

interesting aspects which emerged from the survey indicated that our curriculum was too technical, and that IS managers and businessmen wanted more emphasis on general and communication skills. While we were introducing CASE tools at the first year level and required students to develop a proficiency in the use of a particular tool, results indicated that only a familiarity of such tools was required, while graduates were expected to have proficient writing skills and presentation techniques.

Phase D: Rethink the current assumptions and norms

This phase could easily be a quick exercise of "making sure that we are still on track", serving little purpose. A more thorough rethink could proceed as follows (not necessarily sequentially):

- Decide upon an external standard(s), such as IS'95, against which the current program will be compared (if this has not already been decided during external assessment)
- Determine the assumptions and norms which form the basis of external proposal(s) but not of the current curriculum
- Identify the "reasons" why these assumptions were used or not used and decide upon their validity.

We decided to use IS'95 as an external standard, and, to enable us to compare our current program against it, we undertook a formal analysis of IS'95. The concept of formal curriculum analysis is not a familiar one for IS persons, and we had to search extensively for a model to guide us. We used the work of Ariav who analyzed 45 schemes for doing curriculum analysis, and, in order to compare the different schemes, defined an "ideal" scheme. Ariav found the curriculum analysis scheme (TIE) of Gibboney to be superior to all other schemes, and these credentials convinced us to use TIE in our analysis of IS'95. The results of this work have been reported elsewhere and will not be repeated here. We will only briefly mention what is included in the analysis.

In an analysis of a curriculum according to Ariav, one needs to draw conclusions about the intrinsic value of the curriculum, its implicit paradigm, strengths and weaknesses and its ability to facilitate users' curricular and instructional decision making. In a first order interpretation of IS'95 we analyzed the intrinsic value of IS'95 with respect to its objectives, its subject matter and its orientation with respect to thinking and experience. In a second perspective we analyzed the underlying paradigm that forms the basis of IS'95. Amongst other conclusions, we deduced that IS'95 expects graduates to act as problem solving experts in the domain of computing, and that students are prepared to contribute to increased effectiveness and productivity in the work environment. Lastly, in a third perspective, we analyzed the strengths and weaknesses of IS'95. There is an apparent weakness of rigidity which, however, did not constitute a limiting factor since we used the analysis of IS'95 to appropriate only the relevant parts from IS'95.

Phase E: Identify the assumptions and norms which should be reconsidered

Enough material should by now have been accumulated to enable one to decide which assumptions and norms to retain. Assumptions and norms which had no influence on any components of the curriculum would be candidates for serious reconsideration. While deciding about these, one would normally also revise the remaining assumptions and norms.

After nearly twelve months of relative hard work, in which we met once a week, we had reduced our assumptions and norms (unearthed during Phase A) to the following set of twelve principles, comparable to Denning's 1992 "declarations." We see Information Systems as an interdisciplinary field of study in which information, information technology and the integration thereof with the organization are studied in order to benefit the entire system (individual, organization and society) Our teaching program prepare students to become information systems professionals who are ready to enter the world of work and to function in the multi-national and global context of today's information dependent organizations Our curriculum is aimed at establishing three basic abilities: the ability to think independently, the ability to integrate knowledge and relevant facts, and the ability to act as a knowledgeable partner of clients outside the domain of computers We follow a student-centred approach, and expect students to be independent and lifelong learners. Lecturers do not only act as presenters of teaching services, but also as mentors and facilitators of the learning process We respect the individuality of students - not only at the personality level, but also with respect to background and ability, and undertake to advise them accordingly and personally. Our teaching is aimed at preparing students in a very dynamic field for a very dynamic market. In order to retain the confidence of all stakeholders, we regularly undertake surveys amongst employers of our graduates and amongst alumni to determine to what extent our curriculum meets the requirements of practice. Although we are sensitive for the requirements of practice, we retain the academic right to follow a long-term vision in the compilation of our curriculum.

- We set an example for students, and cultivate a consciousness of and respect for the moral and ethical consequences of their actions in the field of computers and information
- We prepare students for a career as system analysts/designers and knowledgeable supporters of end users
- We measure our standards against those of world class departments of Information Systems
- We believe that systems are developed by people for people
- We do not see technology as an end in itself. At the same time we believe that appropriate technology can support the improvement of the quality of life and work

Phase F: Constitute the new program and course contents

In this phase, the institution formally establishes its new program and gives details of course contents and teaching methods, using revised or new assumptions and norms. The level of detail achieved in IS'95 could be the ideal, providing students and faculty with clear road maps or study guides. An institution should, however, not adopt the IS'95

format simply because it looks impressive on paper. If this differs considerably from local standards, it could prevent the internalization process and hinder, instead of support, the acceptance of the new curriculum.

Having done the groundwork during the previous phases, the final phases of actually putting together the new program should be relatively easy. In reality, this is not the case, and we discovered that a lot of hard work, often leading back to previously covered terrain, remained. We started teaching according to the new curriculum in the academic year 1997, eighteen months after we embarked on the curriculum revision project. The curriculum obviously has to phased in, and will only be fully in place in academic year 1999.

There is little purpose in explaining in detail how our curriculum differs from IS'95. That is, indeed, not the point. We used IS'95 as a reference, but in the process designed our own curriculum by an appropriation of IS'95 to meet the needs of our specific environment, serving to prepare our students for their eventual work lives in this country. We believe that this ensured the right balance between introducing students to "universal" IS concepts and approaches, and paying specific attention to local needs and requirements.

Conclusions

It should be clear that our process of curriculum revision was firmly based on IS'95. At most, however, this means that we based it on an understanding of IS'95. Understanding and interpretation are intrinsically dependent upon each other, and our interpretation of IS'95 is deeply rooted in the context of our situation. The understanding that we reached in the process of interpreting IS'95 cannot be imparted to an audience who can then utilize it for whatever purpose they see fit. What then is the purpose of describing our efforts at making sense of IS'95, and of using this interpretation to revise our curriculum if we cannot share the results with an audience? The answer lies therein that we believe it valuable to share the process that we followed to come to an understanding (however incomplete) of IS'95 with other educationalists. The use that they would then have from this account is simply this, that it shows the way such understanding and eventual appropriation of IS'95 can be reached. There are no short-cuts. Thus, if one simply uses IS'95 as a reservoir of possible courses, one has to realize that there is little probability that an exercise in which a curriculum is built or "improved" by picking courses from IS'95, shall lead in any way to an improved curriculum. More possibly, the result would be an increase in the patchwork quality of the existing curriculum.

Such an attempt at curriculum design or curriculum revision is not only unsatisfactory from an aesthetic design point of view, but will most likely also, upon implementation, be unsuccessful. Certain important aspects related to a curriculum are not addressed when one simply takes from IS'95 what would seem to be required, and, e.g., ignore the backgrounds and experience of learners prior to entry into the program; the environment within which it will be taught, and the expectations/requirements of potential employers.

Academics often declare their curricula to be designed to prepare the student for a long worklife, but shirk their responsibilities to ensure this during the design of curricula.

The structured method we have described presents a practical way of building or revising curricula, and can be followed by any institution. The duration of our project should not be used as a yardstick: we had to develop the methodology as we went along. There should be no illusions, however: to do a proper job of revising or designing a curriculum requires dedicated work and enough time. Perhaps that is why so many institutions opt for the easy way out, and adopt published curricula?

References

Froneman, L and Roode, J.D. "Reviewing IS Curricula: A Practical Approach," South African Computer Journal (16), 1996, pp. 31-39.

Further references are available upon request from the second author.

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