Study Skills Interactive Web-Based Training Environment

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Abstract: It has been acknowledged that students who reflect on their past experiences and as a result form and apply new concepts and hypothesis to present situations move from being passive learners to active doers [1]. This paper describes the design and development of a web-based application whose purpose is the provision of flexible student-centred training in study and transferable skills utilising the above concept. The system offers a suite of interactive modules whose content is designed to engage the student user and entice them to reflect on their own past experiences thus encouraging them to become more effective and efficient independent learners. To achieve this interactivity of the system the student user is required to complete various different activities such as 'Drag & Drop', 'Multiple Choice', etc that requires them to contemplate upon their own familiarity before they make their choice. The system also encourages collaborative and peer-supported learning by offering a discussion forum that enables students to share ideas and experiences.

Key-Words: - Study Skills, E-Learning, VLEs, Independent Learners, Collaborative Learning

1 Introduction

Education has always played a fundamental role in society. Without a good education infrastructure skilled personnel would not be qualified which are necessary to sustain and build any modern civilisation. For this reason many education administrations worldwide place significant time and funds into developing their education policies. In no place is this more evident than in third level institutions. The last forty years has seen an enormous increase in the number and diversity of students entering third level education. This demonstrates the increasing role of third level institutions in producing a "…high-skilled, knowledge and innovation-based economy that will underpin ongoing and sustainable prosperity" [2].

Students entering third level education for the first time face a number of significant changes in their daily lives. The most notable of these changes in terms of education is the new responsibility they must accept for their own learning. They are no longer told what to do, when to do it and how to do it. All decisions right or wrong must now be made by themselves.

For students to be successful in third level education and effective as graduates it is acknowledged that they need to acquire efficient and effective study, learning and transferable skills [3, 4]. As already mentioned in third level institutions students must become more independent learners, taking responsibility and ownership for their own learning and learning outcomes. To achieve this they must learn to examine past experiences and make any amendments to their practices essential to surmount new challenges. In addition research has shown that recent graduates do not possess the necessary skills required for full time employment. In fact it is often communication skills, problem-solving abilities and interpersonal skills that highlight those who are preferred for employments [6, 7]. It is the responsibility of third level institutions to ensure their students are equipped with these skills. There are a number of methods incorporated by third level institutions for the provision of study skills training. In general, there are three common approaches (a) training by modules that form part of the course curriculum, (b) availability of additional classes/workshops, and (c) provision of written and other multimedia materials.

Unfortunately these approaches have significant drawbacks. First, students see study skills training as remedial and therefore, if voluntary, they are generally not attended, particularly by those who would benefit most from them [6]. Secondly, students who are required to attend study skills modules often fail to see the importance of them

which has the undesired effect of reducing the students motivation to complete the module to a satisfactory level. Thirdly, the poor flexibility of time and location of these courses often contribute to inadequate attendance. Studies have also shown that no two students will study the same way therefore these courses/modules cannot be taught using conventional methods i.e. presenting vast amounts of general information. They need to be presented in such a way that the student can personalise the content to suit their own problems and needs [6].

Web-based learning environments are becoming progressively more common as a support tool to assist teachers in creating material that is both stimulating and engaging [7]. Taking this into consideration our approach to the above issues has been to provide an engaging and interactive study skills training system which is facilitated by an online web-based learning environment [8].

2 System Specifications

As already discussed in the introduction students in third level education do not possess the essential skills required to obtain a degree that reflects their ability and to become effective as practising graduates after college. It is readily acknowledged that some form of study skills training that encourages students to become independent learners is required in order to overcome this problem.

The initial step in the design and development of the system was the conduction of a survey of students and academic staff spanning numerous departments and disciplines throughout the institution (University of Limerick). The survey was comprised of approximately thirty multiple-choice questions with the purpose of determining the various problems faced by students in terms of study, the extent of these problems and some solutions that could be employed to overcome these problems. The questions in the survey were divided into the following three categories:

- Problems faced by students when studying and learning.
- Personal study habits.
- Potential solutions and preferred training environment.

The questions in the first category were designed to expose the various problems students have when studying. By asking questions such as 'Do you have problems with…' it was determined that there are nine major study areas that provide trouble for students. These range from planning and time management, which proved the most problematic with 48% of those surveyed indicating difficulty, to note taking which was the least problematic with 8% (see Table 1).

Analysis of the students' feedback regarding the second category of questions associated with the study habits enabled us to identify some of the reasons behind the problems indicated by the students in the first category. For example, we found that 50% of the surveyed students usually study in environments that lack adequate resources and are prone to distractions. Another question concerning time spent studying, showed that the majority of the students (64%) consider that 5 or fewer hours per week on average is sufficient.

The final category of questions was designed to collect as much data as possible regarding what students and academic staffs believe would the most effective approach of providing study skills training. Results indicated that the majority of students (60%) would have a preference for the on-line system. The audio/video option was the least popular solution.

Table 1. Study requirements survey – areas of difficulty

Area of Difficulty	Percentage
Effective Planning & Time Management	48
Reading Effectively	18
Learning Blockages	12
Notes Taking	8
Writing Reports & Essays	18
Researching & Conducting a Project	26
Understanding Course Material	24
Revising	32
Preparing for Exams	24

Taking full advantage of the phenomenon of asynchronous learning networks (ALN) which has radically altered the face of higher education worldwide and based on the findings of the survey and analysis of the received data, as well as on the discussion presented in the previous section, a web-based study-skills training system that would best serve the students' needs and preferences collectively was designed and developed, as will discussed in the proceeding sections.

3 The Skills SuperStore System

3.1 System design and architecture

To reiterate, the purpose of the 'Skills SuperStore' system is to provide study skills training by moving the teaching/learning away from the traditional

teacher-led instruction process to a more student-centric process whereby students will become more independent and responsible learners taking charge of their learning by becoming active learners and determining their own learning outcomes [7].

To achieve an environment that will facilitate the above purpose the system was designed and developed with two main physical layers: the system front-end and the system database (see figure 1).

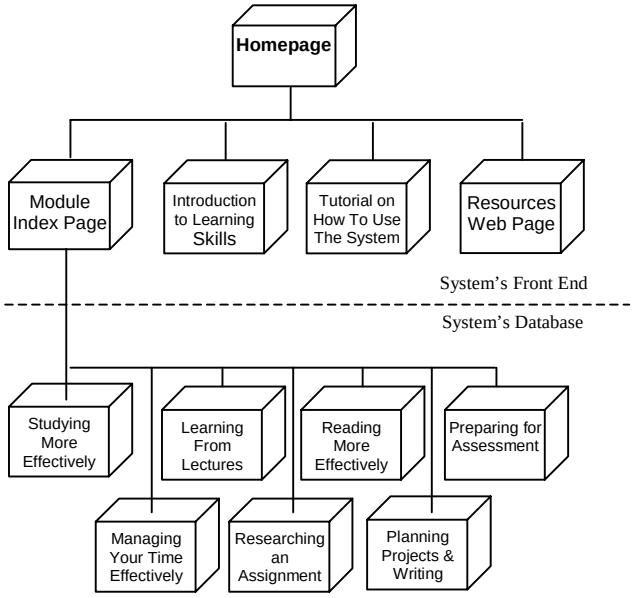

Fig.1. Architecture of the 'Skills Superstore' system.

(a) *The system's front end* is comprised of a number of dynamic and static web pages that provide the user interface of the system. It is via this user interface that the students interact with the system and more specifically the various offered study skills modules. The front-end layer of the system also provides links and facilities for collaborative learning in the form of a discussion forum, search and feedback features for the student user and authoring tools for tutors/administrators.

(b) *The system database i.e. a relational database* stores all the components, which comprise the pages of the study skills modules offered by the 'Skills SuperStore' system. This enables easy generation of module content to suit various different student user preferences as indicated by their answers to various interactive activities etc (as will be discussed in further detail in the following section). The system also enables easy maintenance and updating of the current and future study skills modules by administrative users (*See Figure 2)*. All the modules offered by the system provide the user the opportunity to assess their own study habits and develop these study skills to be successful in college. Material included has been adapted from a number of references [8] and web sites.

The dynamic linkage and integration between the web pages of the first physical layer and the database has been facilitated by using an approach based on the Java Database Connectivity API (JDBC), Java Server Pages (JSPs) and JavaBeans [10].

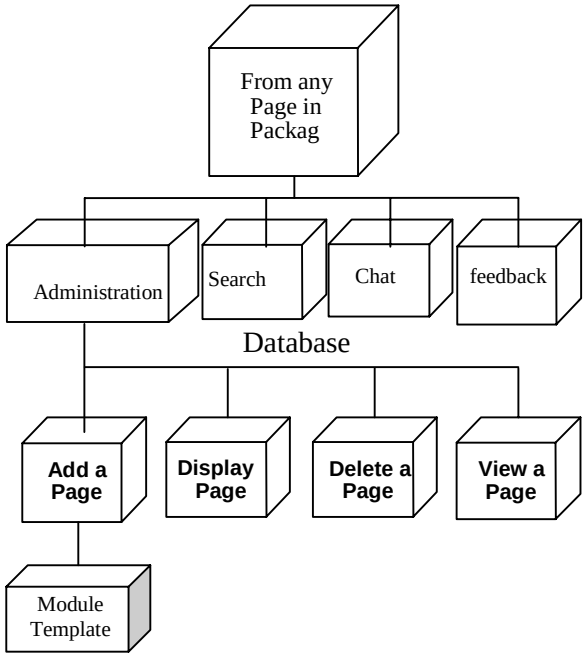

Fig.2. Functionality and main facilities of the system

3.2 System Functionality and Use

The computer motivates. It is non-judgemental. It will inform a student of success or failure without saying by word or deed that the student is good or bad. The computer individualises learning, permitting mastery at ones own pace. In most instances, the learner has far more autonomy than in many other teacher directed settings…such generic qualities allow the learner more often than not to be in charge [11].

It is important to note firstly when discussing the systems functionality and use from a student users perspective that no two students will have the same study skills or for that matter no two students will employ the exact same method to achieve a certain study task. For this reason modules that provide vast amounts of general information on the various study skills are unproductive. Each module offered needs to be such that it is created based on the answers of interactive activities (i.e. it is possible that each

student user will go through a module using different paths).

To gain a comprehensive understanding of how the interactive study skills modules assist third level students in acquiring and developing various study and transferable skills an overview of the delivery mechanism and content of a typical module are presented in the following subsection

3.2.1 Accommodating Different Learning Styles

It is imperative to reiterate firstly that the purpose of the study skills modules is to assist third level students in acquiring and developing various study and transferable skills in such a way that the modules are customised to suit each individual students' personal needs and problems.

Once the user has successfully logged onto the system and has been identified as a student user they are automatically directed to the student menu page. From this page the student user then selects the 'Course Menu' option, which directs them to another page listing all of the modules made available by the 'Skills SuperStore' system. From this page the student user selects the module they desire to complete. This selection has the effect of extracting from the database table corresponding to the module selected the first record and placing each of the record elements in their specified locations in the appropriate module template. As the student user progresses through the module the next record in the database table is extracted that corresponds to the specified page and is again placed in the appropriate module template.

Each of the study skills modules offered by the system commences with one or more general introductory pages. However as already mentioned delivery of the module is designed such that it enables the student user to customize the module to contend with their own personal problems and needs. So at some stage the module must become more specific to the user and for this reason will require direction from the student completing the module. This is achieved through interactive pages, which engage the student via answering questions and performing activities. There are four types of interactive activities used in the "Skills SuperStore" system modules:

- Matching/Drag & Drop
- Picture Selection
- Multiple Choice
- True or False

Based on the answers or selections made by the student user in an interactive page will determine what content will come next in the tutorial.

To provide a more detailed explanation to how the above actually works a run through the prototype module, "Planning and Time Management", is presented. When the student user commences the module they first encounter a number of universal overview pages presenting an introduction to planning and time management, the importance and need for it and the current situation in terms of how students manage time. Following this a brief prologue to motivation is provided explaining what internal and external motivation is. The student user will then encounter the first of the interactive pages. They are asked whether they have difficulty with clarifying motivation when completing general tasks. Based on their answer the subsequent content to be displayed to the user will be determined. For example if they responded "No", i.e. that they find no difficulty with clarifying their motivation, they pass over all the information provided on how to generate motivation that would have been displayed had they selected "Yes" and progress straight to the next topic on goals (see Fig.3). This interactive functionality of the system continues as the student user advances through the module. Each time they encounter an interactive page they make a selection based on their experience and consequently the module is customised to concentrate on the information required by the user.

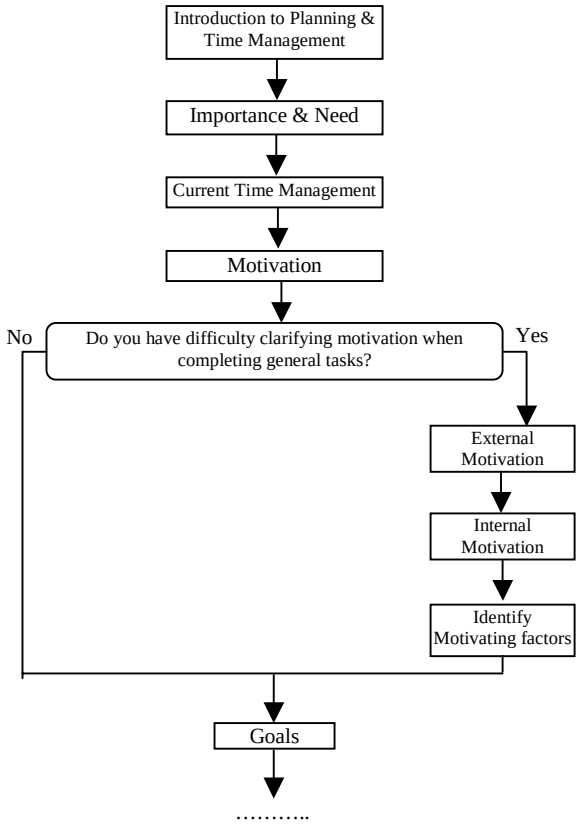

Fig.3. System Functionality and Use for Student Users

3.3 System's Evaluation

As revealed earlier, the purpose of the 'Skills SuperStore' system has been to provide an online learning environment to assist third level students in developing study and learning skills in such a way that encourages the students to become active participants in their own learning. By offering this system, it has been envisaged that both students and staff will benefit from the following outcomes:

- Improving students' academic performance via developing their study and learning skills.
- Improving students' transferable and professional skills thus enhancing graduate employability.
- Developing more responsible, independent and life-long learners.
- Promoting appropriate use of technology in teaching and learning approaches in third level institutions.

To-date, feedback collected by a number of lecturers/tutors from the Teaching and Learning Centre in UL, and regular system trail tests by students has indicated a good level of satisfaction with the system, its contents and use. Currently, a plan to add a separate feedback facility to the system in order to observe and collect information on its use and effectiveness over the whole academic year is well underway.

4 Conclusion

The design, development and deployment of an online interactive study-skills training environment has been communicated in this paper. The system has been designed, not to be used as a standalone application, but in conjunction with existing study skills learning material and resources in third level institutions. The purpose of the 'Skills SuperStore' system is to engage students, encouraging them to become independent learners by compelling them to reflect on past experiences and completing interactive activities thus determining what content is displayed next. Initial feedback has been encouraging and a structured long-term evaluation process has been planned, some of which is well underway.

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