AN APPROACH TO TEACHING MIS COURSES IN ADULT EDUCATION

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ABSTRACT

This paper presents a study of non-traditional students and a model of how to present and develop programming courses to meet their needs. This paper is organized as follows. First prior conceptual studies on nontraditional students were briefly reviewed. The paper then discusses many of the basic problems confronting the non-traditional students and finally the development of common procedures and programming algorithms. Requiring algorithm development before coding computer programs demonstrates to the students the complexity and need for careful design. Introducing the topic of algorithms and algorithm creation using pseudo code is often a stumbling block for non-traditional students. However, introducing algorithms should be as simple as writing a description of procedures acted out every day by all of us. For the non-traditional student the use of pseudocode to express algorithms that solve business problems gives those students a valuable insight into the design of complete computer programs using any programming language.

Keywords: non-traditional students, adult education, programming courses, algorithm.

INTRODUCTION

Over the past few years the universities have experienced an increase in enrollments of the non-traditional students**.** Colleges and universities across the country are a mission of intellectual aspiration and culture that is ever changing. Researchers have defined two distinct groups of students, traditional and non-traditional. Typically, non-traditional students are defined as over twenty-four years of age or returning to school after a significant gap in their education, attaining their first undergraduate degree. The traditional student is defined as under the age of twenty-four and attending college for the first time (Kinsella, 1998). Non-traditional students are on the rise nationally across college campuses. They make up approximately half of the undergraduate students enrolled in colleges today (Kinsella, 1998). This influx of students is attributed to governmental needs, educational needs, women in the workforce, and higher professional standards (Moses, 1990). Due to the increase of non-traditional students, colleges and universities are redefining services to meet the needs of these students.

In the future many workers primary activities will include technology. Workers will have to gather, create, manipulate, store and distribute information related to products, services, and customer needs. Computer networks will be interconnected with information systems that will affect all industries. Individuals that will be able to step into these new technology occupations will be in great demand.

This paper presents a study of non-traditional students and a model of how to present and develop MIS courses to meet their needs. This paper is organized as follows. First prior conceptual studies on nontraditional students were briefly reviewed. Then a non-traditional student assessment of Shippensburg University, and a discussion on the results of the assessment, and finally how and when to present MIS course material to the adult learner.

Overview of Non-Traditional Student Literature

Non-traditional students have been the focus of investigative research on many college campuses nationwide. Researchers continue to provide the educational field with studies designed to accurately measure and assess the effects and benefits of services for non-traditional students. These studies measure student adjustment, integration, involvement, and success, both academically and socially. The review of this literature examines the diversity the adult learner and addresses some of their needs.

Non-traditional students are motivated differently to learn within the classroom. These students are motivated to enhance their present career or transition to a new career. According to Holtzclaw (1980; as cited in Bishop-Clark & Lynch, 1992), non-traditional students prefer an interactive learning style that includes hands on educational approach and practical application of the subject material. The non-traditional students have problems with abstract learning and show increased difficulty with topics that have no career relevance. In contrast, the traditional students are more comfortable with a passive learning style that is primarily lecture based with little emphasis on practicality (Bishop-Clark & Lynch, 1992).

Non-traditional students bring a different dimension to the education process. However, professors need to be aware of the non-traditional students needs and implement strategies to meet their learning style. The diversity in the classroom brings different perspectives and motivations to engage learning on a higher level (Brumagim, 1999).

Researchers also suggest that in order to break down the barriers between the traditional and non-traditional student that class time be used to express differences. This can occur by having students discuss their interest in the class, opinions on working together, and different life experiences and backgrounds. This is a forum that allows students to voice their apprehensions and get to know each other better. Also, the instructor can focus on similarities that all the students in the class have, such as an interest in taking the same course and the requirements to be fulfilled for the class. This enables all students to see themselves as equals, and as students who have come together to reach a similar objective (Bishop-Clark & Lynch, 1992).

Non-traditional students have tension not only in the classroom, but also outside of the educational setting. At Texas A&M International University, a Student Survey (November, 1997) was distributed to 301 non-traditional students to address their stress outside the classroom. This survey indicated that, aside from these students attending full-time classes, 64% of them were working full-time or part-time to support a family with an income lower than thirty thousand dollars, 29% had school-aged children, and 79% did not take care of themselves properly by eating regularly or exercising. These students expressed difficulty in balancing their responsibilities of school, work, and family. The data from this study indicated a need for expanded services on health education and counseling for these students (Coppock, 1998).

Non-traditional students in a private college in Florida were surveyed on supportive services that are needed to assist them on the campus. These students indicated the following needs: a commuter lounge, social activities that would make them feel a part of college life, study groups, stress management classes, financial planning, study skills instruction, and emotional support groups (Frederick, 1997; as cited in Kinsella, 1998).

Development of the class content for career-oriented programming courses requires an investigation. The question that needs to be investigated is what current language or languages are ones that could elevate a career or allows a career change.

COBOL, JAVA, Visual BASIC, and C++ were languages of choice for the Programming Contests at the 2001 Association of Information Technology Professionals (AITP) 6th Annual Collegiate Conference, (*Information Executive*, February 2001). Are these languages the ones that support career enhancement and career change? This question may be answered by inspecting the make-up of the AITP, formerly known as the Data Processing Management Association (DPMA).

According to Linda Clark, Managing Director/Editor of the *Information Executive*, the AITP is represented worldwide by over 4,800 Information Technology Professionals and over 5,800 college students. A committee representing the Information Technology Professionals and Computer Science/Information Technology educators selected the four computer languages stated previously that were used for the 2001 collegiate conference. These languages therefore represent the selection of current industry professionals and educators.

Assessment Procedures

The following procedures were used to carry out the needs assessment of non-traditional students at Shippensburg University. The assessment was divided into five areas, they were academics and scheduling, administrative support, student services, counseling and advisement, and other university services. Surveys were conducted of the non-traditional students as well as interviews of administrative support units, student services, and counseling and advisement offices. The study consisted of surveying 336 non-traditional students at Shippensburg University of which 112 students responded to the questionnaire.

The following suggestions were a result of this investigation.

Administrative Support

1. Develop a single point of contact for non-traditional students seeking information on admissions, financial aid, and fundamental university procedures prior to first-time registration. List that telephone number in all general and university telephone listings.
2. Prepare and make available a basic information booklet to be distributed to all interested and enrolled non-traditional students. Include in that booklet information relating to all special and regular services that are available to students at Shippensburg.
3. Identify an admissions counselor with specific responsibilities for responding to questions from prospective/interested non-traditional students.
4. Develop and offer a comprehensive, separate orientation program for non-traditional students at a time that is convenient for them.
5. Provide staff training about dealing with the needs of non-traditional students.
6. Reconsider fees for the older non-traditional student especially in the areas of health and activities fees.

Academics

1. Consider offering more classes in a format that will allow non-traditional students to combine Internet assignments with class meetings, perhaps on Saturday mornings.
2. Recommend that all degree programs offer courses required for graduation (in the major) on a rotational basis that includes early morning, late afternoon, or evening classes, and offer classes that are ½ Internet and ½ classroom.
3. Consider sensitivity training for faculty to better deal with non-traditional students
4. Recommend that all degree programs offer courses required for graduation (in the major) on a rotational basis that includes early morning, late afternoon, or evening classes.

Course Methodology for the Adult Student

Many textbooks written for undergraduate Information Technology courses are written for the traditional college student. Example programs and program exercises in these texts are for trivial applications. Non-traditional students typically having had job experience, require examples and exercises directly applicable to solving business problems. Writing computer programs for Accounting, Manufacturing, Inventory Control, for example, help students understand how to create software to solve "real world" business problems. In Systems Analysis and Design and Database courses use Microsoft Project for project planning exercises.
A central concept of computer science offered by Professors Norman Gibbs and Allen Tucker, Gibbs 1986, is the study of algorithms. Their definition includes four components, two of which are significant for computer programming – applications and linguistic realizations of algorithms.

The dictionary definition of the word algorithm is:

Algorithm n. Math. A mechanical or recursive computational procedure.
Informally, an algorithm is an ordered sequence of instructions that describe a solution to some specific problem. The algorithm instructions all belong to one of only three categories of operations, Schneider, 1998. The operations listed are those found as the basic logical computer programming instructions found in all computer languages, namely sequential, conditional and iterative operations.
Non-traditional students have been exposed to numerous examples of these operations. Having the students document work processes they have been part of or have observed in business and industry helps them understand the relationship of algorithms to the three basic operations. Constructing an algorithm for a subsystem of a Purchasing System business application, showing the operations Sequential (S), Conditional (C), and Iterative (I), can be demonstrated. Keeping in mind that "a problem can be solved by many different algorithms", Shaffer 2001. The following is one of the many possible algorithms for solving the Purchasing Parts problem.

Purchasing Parts

Step 1. Engineering design of a part -- (S)
Step 2.0 Develop Vendor list capable of supplying components or the part. -- (S)
    Step 2.1 Identify potential vendor -- (I)

Step 2.2 Evaluate vendor qualifications -- (C)
Step 2.3 Accept/Reject vendor -- (C)
Return To Step 2.1 for next vendor -- (S)
Step 3.0 Decide stocking levels and economic order quantity -- (C)
Step 4.0 Place order with vendor -- (S)
Step 5.0 Receive Ordered part or components -- (S)
Step 6.0 Validate order received – (I)
Step 6.1 Order quantity matches Y/N -- (C)
Step 6.2 Order quality matches (QA acceptance) -- (C)
Step 6.2 Approve / Disapprove Order received -- (C)
Step 7.0 Prepare request for payment -- (S)
Step 8.0 Obtain approval signature(s) for payment -- (I)
Step 9.0 Submit for payment to accounts payable -- (S)
Return to Step 4.0 for next order, OR Stop – (S)

A student, with some business purchasing experience would observe that the above algorithm is understandable. A more detailed algorithm would be required otherwise. For example, algorithm Step 4.0 Place order with vendor would need to be detailed in to more sequential, conditional, and iterative steps.

Once the algorithm is developed and understood the student would be able to state the solution using pseudocode. "Psueudocode represents a compromise between the two extremes of natural language and formal programming languages", Schneider, 1998.
Natural language tends to be too verbose to use for pseudocode and formal programming languages tend to be too specific with need to observe syntactical rules for the specific language. The linguistics of pseudocode is "a special set of the English language constructs modeled to look like the statements available in most programming languages, Schneider, 1998. Of course the constructs would vary somewhat if an algorithm was to be implemented in the COBOL language versus a language like Visual BASIC.

The psuedocode for the Purchasing Parts algorithm may look like the following.

SEARCH Vendor database to obtain Vendors capable of supplying the components
or part
SET variables for Stocking Level and Vendor Economic Order Quantity
Compute Order Item(s) Price
Print Purchase Order
SET variables for Received Quantity and Quality Validation
INPUT Received Quantity, and Quality Flag
Evaluate Quantity Received and Quality Flag
Reject/ Accept based upon preset limits (variables)
Compute Order Received Price
Route Receipt Information for approval
Set variables for Approval to Pay
Input Approval Information
Check that all Approvals received for Payment

Output to Accounts Payable – Approval to Pay
Return for processing next Order OR Stop

Theoretically a non-traditional student and possibly a traditional student could take the above psuedocode and prepare computer programs, because psuedocode closely resembles many popular programming languages. The translation from algorithm to computer programs is relatively simple, Schneider, 1998.

SUMMARY

This study was used to carry out a needs assessment of non-traditional students, and develop a suggested programming course for non-traditional students. The research was divided into several areas. The areas were academics, scheduling, administrative support, student services, counseling and advisement, and other university services. The researchers conducted surveys of the three types of students as well as interviews of administrative support units, student services, and counseling and advisement offices. The research explored the issues that were identified in the surveys and interviews. Furthermore, the current processes were analyzed and changes were recommended to these processes to accommodate the needs of non-traditional students. In addition the development of a career oriented programming course was presented.

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