https://doi.org/10.48009/1_iis_2009_40-50

A FRAMEWORK OF LEADING TOWARDS LEARNING THROUGH ACTIVE ENGAGEMENT OF STUDENTS

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ABSTRACT

Teaching undergraduate students can be more challenging than graduate students. Many instructors complain that undergraduate students are not attentive in the classroom and have poor motivation towards learning. On the other hand, the students are very critical in evaluating their instructors. Pedagogical research show that engagement of students in the classroom and other course-related activities can lead to motivation. Students also learn more and retain their knowledge when actively involved in their educational process - passive learning is ineffective and of short duration. Research also suggests that the art and practice of engaging students is principally the responsibility of the teacher. We want to think that a teacher should be a leader who engages students with important activities and challenges that are fun, in an environment conducive to learning, that utilize technology, and guides students towards the goal of mastering the subject matter, with an end product - the knowledge of which will endure a human life beyond the academic environment. This paper reviews some theories of motivation and engagement as well as pedagogies of student engagement that provide significant learning. Based on the findings and from our own experience, we propose a Leading-Learning Framework that outlines the principles and practices for an instructor that can be applied to engage students in-and-out of the classroom and lead them towards the development of an end product, which should be the principal outcome of a course. Finally, we present some initial results of applying the Framework in an undergraduate programming course in Visual Basic.

Keywords: Motivation, engagement, pedagogy, active learning, group project.

THEORETICAL BACKGROUND

Motivation

According to Ryan and Deci [16], to be motivated means *to be moved* to do something. A person who feels no impetus or inspiration to act is thus characterized as unmotivated, whereas someone who is energized or activated toward an end is considered motivated. In discussing motivation for work, Herzberg [10] mentions that motivated people work mostly by feelings of personal achievement, recognition, the work results, responsibility, and advancement and growth. Thus motivation is related to task or activity [16]. People are intrinsically motivated for some activities and not others, and not everyone is *intrinsically* motivated for any particular task. Over the years, researchers have been investigating what task characteristics make an activity interesting. Organized classroom activities rarely fit into the category of intrinsically motivated tasks. Students can either perform *extrinsically* motivated actions with resentment, resistance, and disinterest, or with an attitude of willingness that reflects an inner acceptance of the value or utility of a task [16].

Engagement and Learning

Engagement of students in the classroom activities has been a subject of research for the past two decades. It is seen as an extrinsic motivational task that fosters learning. The fundamental idea underlying engagement theory is that students must be meaningfully engaged in learning activities through interaction with others and in worthwhile tasks [11]. However, engagement is not just a student-oriented activity. Smith et al. [18] provides an excellent review of recent literature on new pedagogies of engagement and classroom-based engagement. The results of National Survey of Student Engagement [13] provide compelling reasons for various forms of student engagement that enrich their learning experience in an educational environment. The Association to Advance Collegiate Schools of Business [1] outlines the standard of teaching and learning as active involvement of students and collaboration and cooperation among participants (faculty-student and student-student). Some of the important and broader arguments towards a change in the mode of education that can lead to meaningful and long-lasting learning experience for students can be summarized as follows:

- *Mode of Teaching and Learning:* The core issue of education is the mode of teaching and learning - learning about things does not enable students to acquire the abilities and understanding they

need for the twenty-first century workers and citizens that America requires [8].

- *Interaction in the Learning Environment:* Two environmental factors – interaction among students and interaction between faculty and students - are by far the most important factors to define educational outcome [3].

- *Involved Education:* Students lean more when intensely involved in educational process and are encouraged to apply their knowledge in many situations [13]. The greater the student's involvement or engagement in academic work or in the academic experience of college, the greater his or her level of knowledge acquisition and general cognitive development [13]. Students who are engaged learn at high levels, have a profound grasp of what they learn, retain what they learn, and can transfer what they learn in new contexts [11].

- *The Role of Today's Teacher:* To teach is to engage students in learning [5]. The art and practice of engaging students towards learning is principally the responsibility of the teacher…. the teacher becomes less imparter of knowledge and more a designer and facilitator of learning experiences and opportunities for students….the real challenge in college teaching is not covering the material for the students; it's uncovering the material with the students [18].

Project-Based Learning

Project-based learning (PBL) is an instructional method that uses complex, real-life projects to motivate learning and provide learning experiences; the projects are authentic, yet adhere to a curricular framework [15]. PBL allows teachers to create tasks whose complexity and open-endedness mimic problems in the real world. Projects that have depth, duration, and complexity challenge students and motivate them towards gaining knowledge. Project-based learning provides a cross-collaborative learning environment which enhances student learning through interactions with each other [12]. It provides improved understanding of subject matters, helps develop communication, planning and teamwork, and provides opportunities to take responsibility. Teams outperform individuals acting alone or in a larger group, especially when performance requires multiple skills, judgment, and experiences [19]. Engagement theory is based upon the idea of creating successful collaborative teams that work on ambitious projects that are meaningful to someone outside the classroom [11]. The three components, summarized by Relate-Create-Donate, imply that learning activities: (i) occur in a group context, i.e., collaborative teams, (ii) are project-based, and (iii) have an outside or authentic focus.

Significant Learning

Significant learning is learning that lasts many years beyond an academic process of a student. Significant learning can make students reflect back to their learning towards a subject, an instructor or an institution. Fink's [9] "*taxonomy of significant learning*," suggests that for learning to occur, there has to be some kind of change in the learner - no change, no learning - and significant learning requires that there be some kind of lasting change that is important in terms of the learner's life. Fink's taxonomy includes six kinds of learning goals:

- *Foundational knowledge:* Understanding and remembering information and ideas core to a subject matter –facts, terms, formulae, concepts, principles, etc.
- *Application:* Learning how to engage in various kinds of thinking (critical, creative, practical) through problem-solving, skills development (communication, technology, etc.) and managing projects.
- *Integration:* Making "connections" between ideas, subjects, and people. The act of making new connections gives learners a new form of power, especially intellectual power.
- *Human Dimension:* Learning about self and enabling interaction with others - discovery of personal and/or social implications of what students learn.
- *Caring:* Identifying and changing one's feelings, interests, and ideas. When students care about something, they then have the energy they need for learning more about it and making it a part of their lives - without the energy for learning, nothing significant happens.
- *Learning how to Learn:* Becoming a better student, inquiring about a subject, and self-directed learners. This occurs when students learn something about the process of learning itself. This kind of learning enables students to continue learning in the future and to do so with greater effectiveness.

Designing the Learning Environment

Based on the research of how people learn, Bransford, et al. [4] mention that a learning environment should be designed according to the following centers:

- *Knowledge centered:* In the sense of being based on a careful analysis of what we want people to know and be able to do when they finish with our materials or course and providing them with the foundational knowledge, skills, and attitudes needed for successful transfer.
- *Learner centered:* In the sense of connecting to the strengths, interests, and preconceptions of learners and helping them learn about themselves as learners.
- *Community centered:* In the sense of providing an environment—both within and outside the classroom—where students feel safe to ask questions, learn to use technology to access resources and work collaboratively, and are helped to develop lifelong learning skills.
- *Assessment centered*: In the sense of providing multiple opportunities to make students' thinking visible so they can receive feedback and be given chances to revise.

The Role of Technology

In the era of high-technology, engagement is also seen as a framework for technology-based teaching and learning. While in principle, engagement could occur without the use of technology, the technology can facilitate engagement in ways which are difficult to achieve otherwise [11]. As found by Arbaugh [2] in teaching online MBA courses, technology is an enabling factor in teaching and learning, not a success factor for effective teaching or learning. When students use technology as a tool to communicate with others, they take on an active role versus a passive role of transmitting the information by a teacher, a book, or broadcast. With technology, instructors and students alike are constantly making choices on how to obtain, display, or manipulate information appropriate and useful for others.

The Central Question

Thus the central question is what role an instructor can play in setting up the classroom and course-related activities that motivate students to value their learning and self-regulate their activities, to carry them out on their own. The former University of Michigan President, James Duderstadt [7] contends that *"faculty members of the twenty-first Century college or university will find it necessary to set aside their roles as teachers and instead become designers of learning experiences, processes, and environments."* Dees et al. [6] mention that teaching is a complex act and it requires a sense of artistry, and it is suggested that a teacher's personal perspectives, history, and beliefs about higher education impacts his or her teaching style. Without arguing, we further believe that teaching is a constant on-the-job learning and improvement process. We further suggest that the 21st century teachers act as leaders to engage students in important activities and challenge them with fun, in an environment conducive to learning, with technology, and guide them towards the goal of mastering the subject matter, and with an end product - the knowledge of which will endure a human life beyond the academic environment.

THE LEADING-LEARNING FRAMEWORK

The *Leading-Learning Framework* mixes the traditional "subject-based learning" and much discussed "project-based learning" in the pedagogical literature. It is based on the concepts of motivation and engagement, active and collaborative learning, taxonomy of significant learning, and designing the learning environment, as discussed before. It uses a "heuristic" approach that includes knowledge from multiple domains such as leadership, project management, applied learning, outcome-oriented learning, technology, job orientation, people, aspiration, and the learning environment that go beyond the classroom.

The Basic Concepts or Guidelines

The following are some basic concepts or guidelines of the framework:

1. *Reduce Burden of Teaching:* The traditional concept of *"teaching by instructors"* should be changed to *"learning by students"* and the burden of teaching of the instructors should be reduced. This however does not mean reduced effort by the instructor, but maximized effort in planning for a course and reduced classroom lectures – *"the instructor acts as a facilitator for the course."*

2. *Increase Efforts by Students:* The burden of learning goes to students. This is aligned with concept 1. Engage students with multiple hands-on activities in-and-out of the classroom with

definite outcomes – *"students take the responsibility of learning."*

3. *Define a Clear Outcome or Product for a Course:* Each course or subject matter must have a clear outcome or product that requires implementation of overall knowledge learned from the subject matter and possibly from other courses. For example, in a "programming" or "advanced web development" course, students should be able to "develop a business information system" using concepts learned in the systems analysis and design as well as database classes.

4. *Formulate a Group Project around the Course Outcome:* Use a "semester-long" group project that incorporates most important concepts or knowledge areas of a subject matter, but focuses on the end-product outlined in concept 3. Without such a hands-on experience, students do not get a clear picture of the purpose of a course, or find a visible outcome that can be measured and appreciated by themselves. It also promotes team building and real-life experience - as desired by the 21st century employers. Students should be allowed to choose their own projects; however, there must be a guideline in terms of the project-complexity and group mixing in terms of work experience, gender, and cultural origin.

5. *Apply Project Management Style in Leading the Project-Groups:* In managing the group projects for a course, the instructor should act as a project manager while the students are the team members. All projects go through the stages of initiating, planning, executing, monitoring and control, and closing [17]. Leading a project towards a successful outcome requires proper planning as well as appropriate monitoring and control mechanisms during the life of the project. The instructor focuses on the big picture of leading the group towards the end-product, while keeping the students busy in weekly course activities. This process gives liberty to students but keeps control to the instructor.

6. *Make All Course-Related Materials Freely Available:* For example, maintain a web site to include syllabus, lecture notes, example problems and solutions, assignments, presentation schedule, past student activities, research papers, and other course-related resources to be available anywhere and at any time. This empowers students with the tools they need to succeed.

7. *Maintain a Dedicated Computer Network:* A dedicated computer network with at least three computer-classrooms for programming, database/e-commerce, and network is a must for an MIS program. The network must have database servers and web servers to store all student-related activities on a daily basis. Each student should be able to create and store an electronic portfolio of his/her work as if he/she is working in a corporate environment. All student-related work should be available through the Internet. Each classroom must have workstations for the instructor as well as students, and all computers must have necessary software tools required to complete prescribed activities for a course. All courses must use a primary software tool used in the corporate environment.

Distribution of the Learning Activities

Based on the concepts of *"significant learning"* by Dee Fink [9] and *"designing the learning environment"* by Bransford, et al. [4], we divide students' learning activities into three major groups. About one-third of the activities will be subject-oriented, one-third is project-oriented, and one-third is multidimensional. The subject-oriented part focuses on learning the concepts of the subject matter, the project-oriented part is focused on applying the concepts through a semester-long group project, and multidimensional part enhances knowledge beyond the subject matter, such as people, prospect, culture, society that are somehow related to the knowledge areas of the subject.

Concept-Based Learning

This is the traditional subject-based learning that students must gain knowledge in taking a course. The key issue is to engage students and create an output for each concept taught in the class. For example, after a brief lecture or demonstration on a concept, the students get involved in some form of in-class activity including producing a document, model, web page, or program; followed by homework assignments as necessary. As shown in Figure 1, the concept-based learning can be thought of as a sequence of teacher input for the concept, student processing through application of the concept, and then producing an output through the process. Each

concept can be covered in the same pattern during the semester; however, there should be changes or adjustments necessary depending on how the learner group is receptive to the planned activities. Most concepts and activities are planned at the beginning of a semester; however, the instructor should make changes in student activities and assignments as necessary to adapt a newly-discovered student group or to introduce newly discovered concepts in the class. This dynamic and active involvement of students moves a teacher away from the traditional nature of instructional cycle: teaching, assigning, and grading. Pedagogical researchers term this as teacher reflection [6].

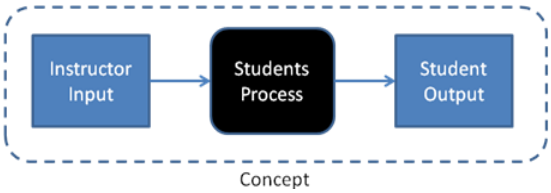

Figure 1: Instructor-student sequence of activities teaching a concept in a classroom

Project-Based Learning

To gain an understanding of the relationship between the various concepts taught in the course as well as to get an understanding of the overall purpose of the course, students must work on a semester-long group project. The group project should be outlined around the major concepts of the course; however it should be divided into several chunks of deliverables spanning the semester. For example, the first delivery might be the problem definition for a business, the second delivery might be an overall design of the business system as well as any rework necessary on the first delivery, and the third delivery might be the completed system. See Figure 2. There must also be monitoring and control mechanisms to verify the progress of the project activities and the quality of the deliveries. One way to monitor and control is to have a presentations on each delivery - resulting a class discussion, feedback and rework, as necessary. Needless to say, the group project promotes teamwork, and presentations enhance communication - both are significantly important in the corporate IT environment.

Multidimensional Learning

This part of student activities broadens knowledge-base for students beyond the course curriculum. Activities include in-class writing, job search, research paper, case studies, new technology, and etc. For example, in a systems analysis and design course, a student should know the current job market and the requirements of a systems analyst in the corporate world. In a web design course, a student should know the same for a web master. Student should also be introduced to magazines, journals, and web resources related to a subject matter through writing formal research papers and making presentations. These kinds of learning and knowledge improve self-confidence and provide feelings of a learning community.

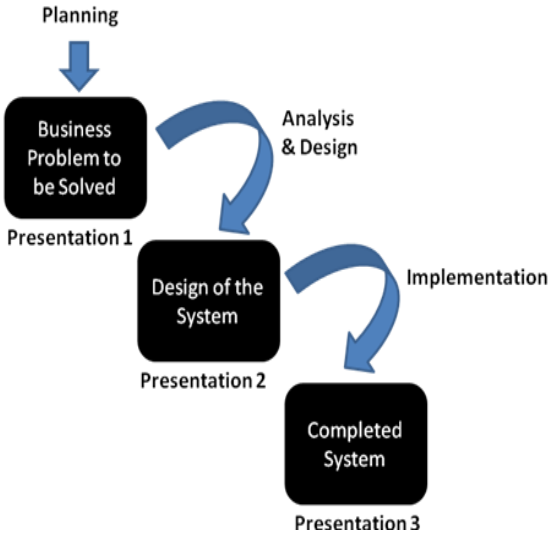

Figure 2: Distribution of project deliverables and project control mechanism

The three knowledge areas form a hierarchy as shown in Figure 3. The project-based knowledge is based on the conceptual knowledge, and the two may be seen as forming the core knowledge to be gained from a course. Multi-dimensional knowledge goes beyond the knowledge of the subject matter – the knowledge that makes understanding of the people, prospect, and environment around the learner.

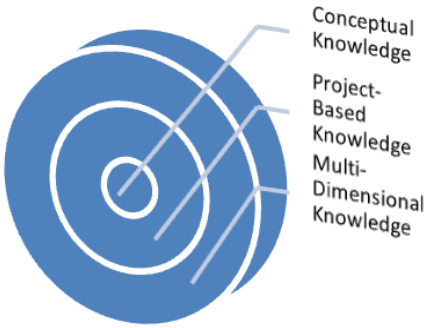

Figure 3: Hierarchy of three knowledge areas

Table 1 summarizes the purposes of the three learning activities. It also shows their relationship with Fink's [9] six taxonomy of significant learning.

Designing the Learning Activities

The student activities should be organized to engage students in-and-out of the classroom, to provide learning opportunities through active engagement, communication, collaboration, cooperation, research, and technology. Our course activities are organized according to the four *"learning centers"* proposed by Bransford, et al. [4] as discussed before: *knowledge centered, learner centered, community centered, and assessment centered*. Table-2 provides some example activities in-and-out of the classroom that fit into these learning centers.

Table 1: The learning concepts, their purposes, and relationship to Fink's [9] six taxonomy.

	Concept-Based	Project-Based	Multi-Dimensional
Purpose	• Learn the primary or most important concepts of a subject matter	• Get a clear picture and the purpose of the subject matter as a whole • Get a practical experience through integrated application of the concepts of the subject matter • Provide a significant learning experience for the students	• Learn the people and the society • Learn other people and other cultures • Learn about the job market and the corporate world • Know the purpose, value, and prospect of education • Learn about the job market related to the subject matter • Gain knowledge towards higher education
Fink's [9] Taxonomy	• *Foundational Knowledge*	• *Application* • *Integration* • *Human Dimension* • *Caring*	• *Learning how to Learn*
Learning Centers of Bransford et al. [4]	• *Knowledge Centered* • *Assessment Centered*	• *Knowledge Centered* • *Community Centered* • *Assessment Centered*	• *Knowledge Centered* • *Learner Centered*

Learning Type	In-Class Activities	Out-of-Class Activities
Concept-Based	• Lecture, demonstration, in-class programming and documentation, case problem, database design	• Homework, documentation, database design
Project-Based	• Presentations on group project deliverables • Discussion and feedback on the deliverables • Repeated presentation until concepts are clear • Demonstration of group project outcomes • Group meetings • Meeting between instructor and student-group	• Group project activities – meetings, e-mails, and development of documents, models, outcomes, and presentations. • Use software tools important to subject matter • Web site development and storage of outcomes to network serves
Multidimensional	• In-class writing • Demonstration of resources such as journals, associations, conferences, on-line library, etc.	• Research papers on jobs, project management, software quality, and maturity models, etc.

Table 2: Example student activities in three areas of learning

APPLICATION IN THE VB PROGRAMMING COURSE

Teaching programming to undergraduate MIS students is a challenge for instructors. Students have an inherent concept that the reason they are in the MIS program is because they wanted to stay away from hardcore programming taught in the computer science programs. However, development of modern business systems require knowledge of complex programming in today's constantly changing high-tech environment. There is no alternative to learn business programming other than solving more and more business problems using appropriate tools and technologies. We apply the concepts of Leading-Learning framework by engaging students in five main activities: *in-class programming, homework assignments, group-project, hands-on test, and group presentation*. Figure 4 illustrates the instructor-student cycle of activities in the course. The instructor-activities are shown in darker color and the student-activities are in light color. Basically, the instructor is focused on the course planning as well as monitoring and controlling the student activities, while the students are kept engaged on the execution of the planned activities. The following course activities relate to the three learning activities outlined in the Leading-Learning Framework.

Concept-Based Activities: The concept-based learning goes in a weekly cycle of demonstration of one or more concepts by the instructor, applying the concepts by the students in class (in-class assignments), and then further applying and understanding the concepts through homework assignments.

Group-Project Activities: The purpose of the group project is to apply the concepts learned from the weekly programming activities to develop a business information system. It also introduces students into the phased approach of developing a system such as the systems development life cycle (SDLC). There are three deliveries during a semester: (i) defining the business problem and the proposed solutions, (ii) designing the proposed system, and (iii) demonstrating the completed system. Refer to Figure 2. Within two to three weeks of the beginning of the semester, project groups are created and a semester-schedule is set up for presentations and is posted on the web site. Examples from earlier semesters are kept on the web site to help and support student activities.

Multidimensional Activities: Due to the nature of the course (undergraduate and programming), not many activities other than programming and business-system development are included in the student activities. However, through the group project, students are exposed to teamwork, communication, systems analysis and design, and database design.

ASSESSMENT

To gain an understanding of the effectiveness of the Leading-Learning Framework in the VB class, we have performed some assessment of the course activities as seen by the students under the following conditions:

- *After the First Project Delivery:* At the beginning, the students are not expected to understand the purpose of all course activities planned. In about one-third of the semester and after the first delivery of the project, an assessment is planned on all course-related activities.

- *After the Second Project Delivery:* After the mid-term and after the second project delivery, students should have a better understanding of what direction the instructor is leading them. As assessment is planned at about two-thirds of the semester.

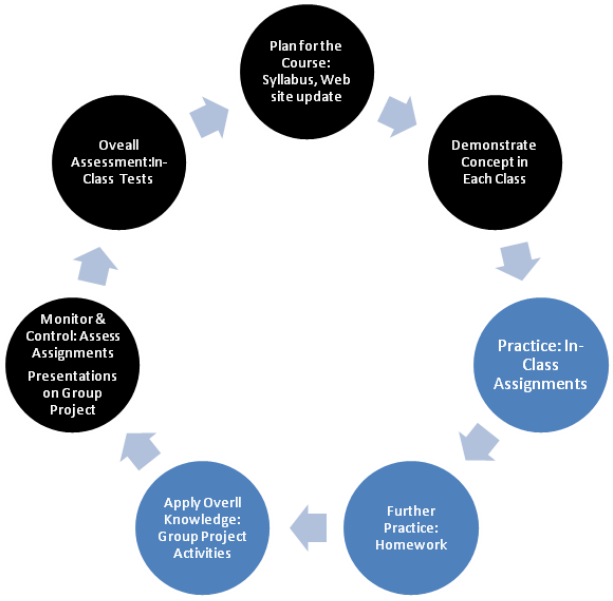

Figure 4: Instructor-student sequence of activities in the VB programming course

As shown in Table 3, a survey instrument was created that contained questions on all course activities. To gain a better understanding on a particular activity, multiple questions are embedded for the same activity. The questions are also organized around five different metrics to understand students' behavior as well as to prove or disprove our concepts of the framework. Answers to the questions are organized as: 1 = strongly disagree, 2 = somewhat agree, 3 = agree, 4 = more than agree, and 5 = strongly agree. In total ten students participated in the survey.

RESULTS

The results presented in Table 1 show that in general the students had a positive experience from all the course activities except the group project. The questions (8, 9, 12, 13, 16 and 17) related to the group project and group presentation show in general lower scores, indicating no significant impact in students' knowledge development on programming through the group project. Results also suggest that there is no significant difference in students' perception before and after the test. The resources provided by the instructor had a positive impact in the learning environment (questions 1, 5, 7, 10, and 14). Responses to questions 2, 3, 10 and 14 suggest that in a programming course, the best method to motivate students is to demonstrate program codes and/or provide examples. Responses to questions 14, 18, 23-25, and 27 suggest that the students are honest about their expectation from the course; however, they are not motivated up to the level of their expectation (questions 19-22).

Table 3: Survey results of instructor-student activities in the VB course

Number	Questions	Instructor Activities	Group Project	Programming Engagements	Motivation	Expectation	Before Test (Max = 5)	After Test (Max = 5)	Average (Max = 5)

1	The syllabus was clearly defined regarding the expectation from the course	x					3.2	3.7	**3.5**
2	The class notes/presentations in Microsoft Word and PowerPoint are very helpful in understanding the course materials	x					2.6	3.3	**2.9**
3	The Instructor In-Class demonstration of program codes is very helpful in understanding the course materials	x					3.0	3.4	**3.2**
4	The In-Class assignments are helpful to understand the course materials			x			3.1	3.8	**3.5**
5	The web site was very helpful in finding almost all course-related materials	x					3.6	3.6	**3.6**
6	The homework assignments are helpful to get an in-depth understanding of the course materials			x			3.6	3.9	**3.7**
7	I try to follow the syllabus on a regular basis to keep up with my assignments and other dues for the class	x					3.7	3.7	**3.7**
8	The group project is helpful in understanding the course materials		x				2.0	2.6	**2.3**
9	The group project is helpful in understanding the application of the course materials		x				2.4	2.6	**2.5**
10	The sample programs posted by the instructor in the web site were very helpful to learn the course materials	x					3.0	3.5	**3.3**
11	The homework assignments were well distributed to gain a depth of knowledge from each conceptual area			x			3.3	3.7	**3.5**
12	The group project is helpful in understanding the use of VB programming in developing a business information system		x				2.6	2.8	**2.7**
13	The group presentations are helpful in understanding the course materials		x				2.2	2.4	**2.3**
14	I made an effort to look at the sample programs posted by the instructor in the web site					x	3.6	3.5	**3.5**
15	The instructor followed the syllabus very closely as planned at the beginning of the semester	x					3.0	3.4	**3.2**
16	The group presentations are helpful in understanding the purpose of the group project		x				2.3	2.8	**2.6**
17	The group presentations are helpful to stay focused on the group project		x				2.2	2.9	**2.6**
18	I have been completing my In-class assignments on a regular basis					x	3.3	3.4	**3.4**
19	I was very motivated to learn the course materials/VB programming				x		3.6	3.6	**3.6**
20	I find myself interested in the subject matter (of VB programming)				x		3.8	3.8	**3.8**
21	I have been completing my homework assignments on a regular basis				x		3.7	3.2	**3.4**
22	Activities of the course make me engaged in the subject matters				x		3.1	3.6	**3.3**

23	My main objective from this course is to get a good grade					x	4.0	3.7	**3.9**
24	My main objective from this course is to learn the course materials/programming in VB					x	3.8	3.7	**3.7**
25	I feel myself to be challenged in the course					x	3.7	3.7	**3.7**
26	I was overwhelmed by the requirements of the course by the instructors	x					2.7	3.1	**2.9**
27	I have been regularly attending the class					x	4.4	3.6	**4.0**
28	The in-class hands-on test was very challenging			x				3.9	**3.9**
	Metrics Average	**3.4**	**2.5**	**3.6**	**3.5**	**3.7**			

CONCLUSION & DISCUSSION

Based on the motivation and engagement theories as well as the need for significant learning in the 21st century education, we have proposed a Leading-Learning Framework which suggests that teachers act as leaders to engage students in important activities that provide a significant outcome culminating major conceptual knowledge areas of a course. The concept of "teaching" is shifted towards "learning" through reduced burden on instructor and increased efforts by students. Furthermore, learning activities in a course curriculum should be divided into three categories: conceptual, project-based, and multi-disciplinary. The conceptual knowledge activities form the core to any subject matter, the project-based activities provides an understanding of the application of the concepts, and the multi-disciplinary knowledge goes beyond the subject matter. All three knowledge activities provide a significant learning experience for a student that will last many years beyond the classroom or educational environment. The concepts and activities of the Framework have been applied in several MIS courses and the results for an undergraduate VB programming course is presented here. It is found that students had a positive experience in all course-related engagements except the group project does not have any impact towards knowledge development on programming. This does not mean however that students did not gain any knowledge on team building, system design, and communication. Most probably, all programming concepts taught in the class are somehow related to business problems, and thus there is no added value to develop a separate business solution. It can be concluded that in an undergraduate business programming course, the best approach is to engage students in programming and provide all resources needed to succeed. Although not presented here, it can be mentioned that the results of applying the concepts in graduate-level MIS courses are different. For example, in the systems analysis and design course, students had significant learning experience through lectures and research papers, and in the e-commerce course, the group project brings the significant learning experience.

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