

Teaching Methods to Encourage Independent Learning and Thinking

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Students pressed for time forego classroom preparation in the hopes that sitting through the class lecture will give them the information they need to succeed resulting in a culture of “spoon fed” academicians. An undergraduate education is important in developing the students’ ability to learn and think independently. This literature review will examine the spoon-feeding phenomenon and address how a teacher can avoid the pitfalls of spoon feeding by presenting active learning method alternatives that will encourage students to become independent learners and thinkers. This problem will be addressed in the context of the West Point academic system and will address solving this problem through application of the Systems Decision Process (Parnell, et. al.) format. First, the problem is defined through a stakeholder and functional analysis and results in a value model. Solutions are developed as a result of idea and alternative generation and are then evaluated by scoring them based on the value model developed. The literature review will form the basis for the stakeholder and functional analysis as well as the values, idea and alternative generation.

“Spoon feeding, in the long run teaches us nothing but the shape of the spoon.” ~~ E.M. Forster.

The Systems Decision Process (SDP) is a methodical process in which to analyze and solve problems. Figure 1 below depicts the SDP which is the process that is taught to cadets in the Department of Systems Engineering at West Point. See Parnell, et. al. for a thorough description of this process and its implementation.

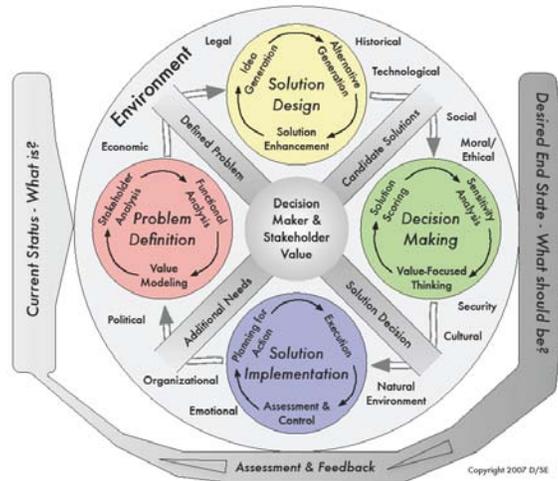


Figure 1. Systems Decision Process

The problem that will be the focus of this literature review is how to encourage independent learning and thinking and therefore encourage student participation in classes, especially in those classes that are required for graduation but not in the cadets major of interest. This entails inspiring students to develop the same curiosities that they have for their major courses by encouraging them to apply independent learning and thinking to classes that are outside their major. This would in-turn deter them from coming to class unprepared and encourage them to be proactive learners rather than reactive, passive, or non-initiating learners. Barr and Tagg address the teaching vice learning paradigm shift that needs to occur to revolutionize the education system towards one that focuses on learning outcomes rather than instructional outcomes.

In order to develop methods to encourage independent learning, we start with the definition of independent learning. "Independent Learning is that learning in which the learner, in conjunction with relevant others, can make the decisions necessary to meet the learner's own learning needs." (Kesten) Kesten emphasizes that independent learning is not "individualized learning nor learning in isolation. Independent learning encourages collaboration and self-motivated inquiry". Watkin states that "... independent learning involves problem-solving, interpersonal skills, industrious activity, self-motivation, creativity, and being reflective.

The handbook for teachers, developed by Saskatchewan Education, spells out the Common Essential Learning's (C.E.L.'s) and are comprised of six categories: Communication, Numeracy, Critical and Creative Thinking, Technological Literacy, Personal and Social Values and Skills, and Independent Learning. This paper will focus on the independent learning C.E.L. The handbook relays that teachers can foster Independent Learning by the following:

- using a variety of ways to gain understanding of their students' abilities, needs and interests;
- making education relevant to students' needs and interests;
- teaching and modeling independent learning skills;
- providing students with choice in assignments and topics within a range of choices;
- increasing students' responsibility for decision making in the independent learning process;

—utilizing collaborative instructional techniques

Table 1 below summarizes the activities to structure learning as described by Kesten and identifies the teacher’s role in this process. See Kesten for a detailed listing of all the actions required for each activity.

Kesten details the series of objectives which would allow these activities to be performed and are presented in Kesten’s work in Appendix A. While Kesten refers to them as objectives, technically Appendix A details the functions or actions one must accomplish in order complete the stated activities. An objective according to Dictionary.com is “something that one’s efforts or actions are intended to attain”. Objectives also state a preference in terms of the direction of improvement and should have an evaluation measure associated with them so the achievement of the objective can be quantified. Applying the SDP and specifically through stakeholder analysis we can better establish the functions, objectives and the evaluation measure to quantify the achievement of the objectives.

Table 1. Activities to Structured Learning Mapped to Student and Teacher Responsibilities

| Activities to Structure Learning | Student\Learner | Teacher |
|---|------------------------------|---|
| Diagnose Needs | Understand own values | Help student ID Values |
| Set Objectives | Describe learning outcomes | Help student ID potential learning outcomes |
| Identify learning resources | ID preferred learning style | Help student determine their learning style. Know your teaching style |
| Use resources | Choose appropriate resources | Help student ID resources |
| Assess learning | Provide honest assessment | Facilitate assessment process |

Another take on independent learning by Crawford, identifies a document, “Learning to Learn” and discusses The SUCCEED Model for Independent Learning. This model “identifies and defines the necessary strategies which enable students to become independent learners. Underlying the SUCCEED Model is a school-based learning skills plan which, when implemented, would act as a foundation to the process of Resource-based Learning.” (Crawford) Table 2 below summarizes the steps of the SUCCEED model by Crawford and compares it to the activities defined by Kesten: Both models are very similar in the approach to enable or accomplish the need of independent learning.

Now that we have defined independent learning and discussed two independent learning models, let’s look at this problem of enabling independent learning from the Systems Engineering perspective. First we define the system. We will apply this problem in the context of the United States Military Academy at West Point which will be the representative “Academic System”. This problem will be framed from the perspective of the teacher and the student when

considering the system's boundaries. Figure 2 below from Parnell, et. al. depicts the structural organization of a system with boundaries.

Given the academic system in question, the inputs from the environment are student interactions, classroom experiences, individual learning experiences, the cadet schedule and other environmental influences of extracurricular activities. The outputs into the environment are the academic products that are a result of the teaching and learning process. The internal feedback consists of the grades students earn as well as the student feedback the teacher receives through surveys and assessment tools. The external feedback is the class ranking system and opportunities that this entails such as summer assignments, branching and posting for first class cadets and student outcomes in all academic endeavors.

Table 2. SUCCEED Model Strategies Mapped to Kesten's Independent Learning Activities

| | Strategies to Enable Independent Learning (Crawford) | Activities to Structured Learning (Kesten) |
|----------|--|---|
| S | Select and focus topic and information needs. | Diagnose Need |
| U | Uncover potential sources of information. Learn how to access them. | Identify Learning Resources |
| C | Collect, examine, and select suitable resources. | Identify Learning Resources |
| C | Compile relevant information from selected sources. | Use Resources |
| E | Evaluate, interpret, analyze, and synthesize the information. | Use Resources |
| E | Establish and prepare an appropriate format and present the information. | Use Resources |
| D | Determine the effectiveness of the whole process. | Assess learning |

. It is noted here that Kesten points out that student evaluations by the teacher should include the student’s behavior as an independent learner. It is also imperative that Teachers know instructional strategies or inputs such as inquiry, discovery, cooperative learning, etc. in order to impart independent learning in their subject area.

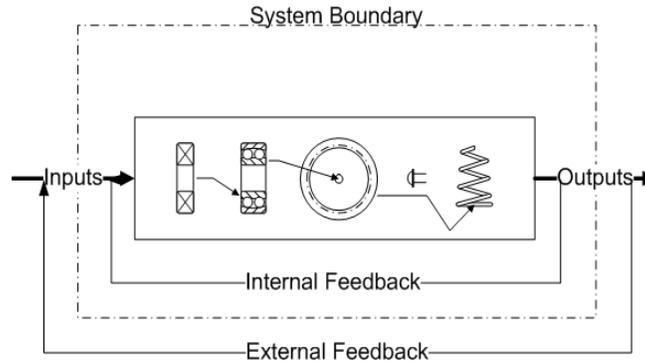


Figure 2. Structural organization of a system with boundaries

In further defining the problem we must conduct a stakeholder analysis in order to determine the people and organizations that have a “stake” in the decision process and help us to define the problem with respect to their needs, wants and desires as they pertain to the problem. Stakeholders help us define the functions, objectives and evaluation measures. The stakeholder analysis allows us to also consider other issues such as political, economic, social, ethical and technological aspects that may also impact the system (Parnell, et. al.). The stakeholders in the context of this problem are the student and teachers, as well as the administrative education staff. Some techniques to conducting the stakeholder analysis in order to gather this information are conducting interviews, developing focus groups, conducting surveys and brainstorming sessions and conducting research. Parnell, et. al., describes each of these activities in great detail. This paper will focus on conducting research and brainstorming activities based on the research and provide a literature review of the stakeholder information. The application of this process to this problem would be a great MTP research project.

The work by Crawford and Kesten are a good starting point for first identifying the functions associated with this problem. The functions identified by Kesten are more expedient than those of Crawford and are all inclusive of those by Crawford so we will use them as our functions in developing the value hierarchy. The top level functions of the functional decomposition are detailed below in figure 3:

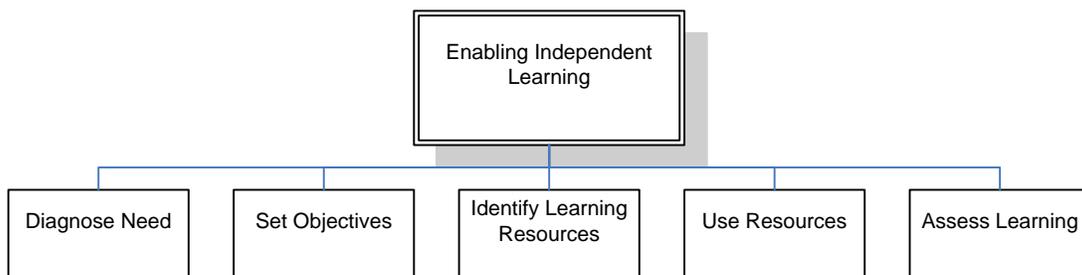


Figure 3. Functional Decomposition

Teachers can help students' assess their learning types. Students can then use Kesten's checklists to determine what their needs are or where they need help in determining what is missing and where they need to focus their attention in developing their abilities to become independent learners. After determining these functions or activities the students should develop objectives with regards to each of the functions. These objectives can focus on improving upon any one of the functions or to acquire that function they are lacking in. Once the objective is identified, the student should develop the evaluation measures for these objectives. This will quantify the attainment of the objective.

The functions, objectives and evaluation measures make up what is called the value hierarchy. Value curves are developed by the student to reflect their preferences in terms of their personal values with regards to becoming an independent learner. These value curves help us in the process of scoring our alternatives developed during the next phase of the SDP. See Parnell, et. al. for the detailed process of developing and utilizing value curves. Figure 4 below defines the personal values the learner must have in order to realize independent or autonomous learning as described in Kesten.

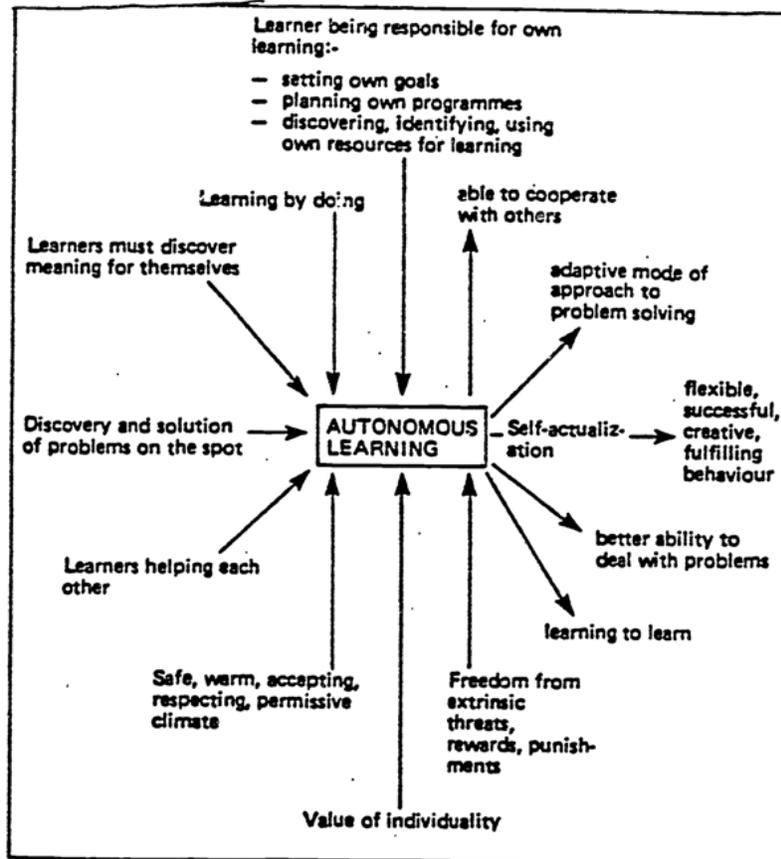


Diagram 1 *Autonomous learning*

(from Boydell, 1976, p 42)

Based upon the ideas of the Association for Supervision and Curriculum Development: (1962), Combs (1962), Dewey (1928), Harrison and Hopkins (1967), Knowles (1970), Rogers (1961, 1969) and Wight (1970).

Figure 4. Personal Values of Independent Learning

The second phase of the SDP is the Solution Design Phase which results in delineating the set of feasible alternatives. Ideas are generated through activities such as brainstorming, brain writing, affinity diagramming and other techniques as discussed in Parnell, et. al. These ideas are then transformed into alternatives and screened for feasibility based on established feasibility

criteria. The literature review and subsequent brainstorming and brain writing resulted in the following ideas for encouraging independent learning and thinking;

1. Utilizing collaborative instructional techniques (Saskatchewan Education)
 - a. Divergent Thinking
 - b. Concept Mapping
 - c. Journal Writing
 - d. Learning Centers
 - e. Inquiry Process
 - f. Independent Research
2. Research-Feedback-Reflection (Skidmore)
3. Distance Education (Skidmore)
4. Virtual Field Trip (Skidmore)
5. Active Learning Activities (Bonwell, ERIC Development Team)
 - a. Visual Based Instruction
 - b. In-class Writing
 - c. Case Studies
 - d. Cooperative Learning
 - e. Debates
 - f. Drama
 - g. Role-playing
 - h. Simulation
 - i. Peer Teaching
6. Interactive Lectures (Chhem)
7. Small-Group Discussions (Chhem)
8. Seminars (Chhem)
9. Project Work (Chhem)
10. Problem Based learning (Chhem)
11. Students choose their own project\paper topics

The idea of independent learning and thinking is directly related to the idea of scholarship. Theall, cites Boyer, who defined four categories of scholarship: Discovery, Integration, Application and Teaching. These four categories should be kept in mind while developing the active learning activities.

The third phase of the SDP, Decision Making allows us to take the candidate solutions and score them based on the evaluation measures derived from the value model. The raw data from each of the evaluation measures as applied to each alternative are then normalized into “dimensionless value”. The total value for each alternative is then computed and the alternatives can then be ranked from the best to least desirable based on the value each alternative receives. This value focused thinking approach allows us to then choose the alternatives that are best suited based on the decision makers values. Chhem states that the “focus of teaching is to train students to assess their own educational needs, to search for relevant information, and to develop their own critical thinking and problem-solving skills. The approach presented here allows students to assess their educational needs, find the

relevant information as it applies to their learning style and apply critical thinking and problem solving through application of the SDP.

The value modeling process allows students to assign weights to their evaluations measures in order to distinguish what is most important to them. As they weigh each of the alternatives, the active learning activities that better suit their values and learning style will score higher. These results can then be used by the teacher to offer a variety of active learning activities that would suit a variety of learning types and more importantly the activities that their students value most.

The SDP introduced here is a method to allow students to assess their needs and the activities that they value. The teacher can then in-turn offer more suitable choices and freedom to the students which would encourage their acquisition of independent learning. Acquiring independent learning skills allows students to gain a “more proactive approach towards life-long learning. (Chang)

Conflicting Views

Chhem addresses why educators resort to spoon feeding as opposed to developing active learning teaching methods that would better facilitate independent learning. He sees lectures as the most common learning environment in which spoon-feeding occurs. Lectures are short and can take less time to prepare and are reusable with minor updates. Lectures are a cost saving measure for both the teacher and the student as they are employed by larger course enrollments. Students are receptive of lectures because there are no requirements for active participation and minimal skills required other than listening, note taking and remembering.

Secondly, in comparing two teachers in the same course, the teacher that spoon-feeds the class is seen in a more positive way because they care about their students to give them all the information they need to succeed in a class. Whereas the teacher that is using active learning methods is thought to be a haze because it requires much more work on the part of the student to be engaged in that class. In a time constrained environment like West Point, the cadets have come to value their individual time more and are therefore driven to seek the path of least resistance. It is recommended that students be interviewed as part of the stakeholder analysis process to get a better of student values with respect to time. This idea takes us to the literature on faculty evaluations. If the teacher perceives that students prefer spoon-feeding and will result in better evaluations, then the teacher is further encouraged to stick with the culture of spoon-feeding.

Bass points out that while he added some “experimental electronic literacy” lessons to his course, his faculty evaluations suffered as a result and cites that it is not out of the ordinary that this happens when teachers add significant revisions to their curriculum.

Dugdale cites that “academics and librarians felt that ‘spoon-feeding’ was a positive teaching methodology for students preparing for professional examinations in terms of spoon-feeding information through electronic means. Certainly the knowledge to be imparted should be considered as some coursework requires the mastery of terminology and definitions or the memorization of facts and dates. In addition, it is noted that different fields may or may not

be suited for all the activities that were brainstormed to enable independent learning discussed above.

Barr and Tagg compare the instruction and learning paradigms advocating the learning paradigm. This paradigm supports the enabling of independent learning and thinking in students.

Annotated Bibliography

Barr, R. and J. Tagg. "From Teaching to Learning – A New Paradigm for Undergraduate Education." *Change* 27.6 (1995): 12-25. Available on-line at <http://ilte.ius.edu/pdf/BarrTagg.pdf>.

This article addresses the instruction vs. the learning paradigm. It discusses the assessment of the education process based on teaching and promotes the shift to a learning paradigm. The structure of the educational system needs to be restructured however to avoid the instruction paradigm and to be able to make the change to the learning paradigm. The article points out that learning should not be based on time as individuals learn at different rates. The chart at the end of the article compares the two paradigms by mission and purposes, criteria for success, teaching and learning structures, learning theory, and productivity and funding.

Bass, R. "The Scholarship of Teaching: What's the Problem?" *Inventio* 1 (1999): 1-10. Available on-line at http://www.doiit.gmu.edu/Archives/feb98/randybass_2.htm.

The scholarship of teaching delves into the issue of how teachers wishing to be experimental and novel in their approach to teaching can cause undue criticism and potentially hurt their careers in the long run. His approach is to be very cautious and to ensure he can articulate "the reasoning behind every aspect of the course".

Blayney, Paul and Mark Freeman. Individualized Interactive Formative Assessments to Promote Independent Learning, Available on-line at http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VDD-4S1BX1D-1&_user=1705979&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_acct=C000054266&_version=1&_urlVersion=0&_userid=1705979&md5=97929d188a654765f93e4de01ff73081, Accessed on 3 March 2009.

This article addresses the promotion of independent learning by automating the assessment of learning with automated questions in an Excel based environment. These assessments are drill and practice learning and/or for assessment purposes.

Bonwell, Charles C. and Eison, James A. "Active Learning: Creating Excitement in the Classroom". ERIC Digest, September 1991.

This article describes active learning and barriers to instructional change which include traditions, faculty perceptions, role definitions, discomfort, anxiety limited incentives, limited class time, increase in prep time, large classes, lack of needed material, equipment or resources and risk that students will not participate.

Chang, T.C. Avoiding Spoon-Feeding: The Creative Teaching of Geography, Center for Development of Teaching and Learning, (CDTL) brief, May 2000, Vol. 3, No.2, National University of Singapore. Available on-line at <http://www.cdtl.nus.edu.sg/brief/v3n2/default.htm>.

Chang gives three examples of how spoon-feeding can be avoided while teaching geography. An exercise designed as a treasure hunt to help the students discover based on personal observation. Second, Change offers giving the students free rein while working on their term essays and project topics. Thirdly, tutorials are created where students learn through role-play.

Chhem, Rethy, K. "Spoon-Feeding in Higher Education, CDTL brief, May 2000, Vol. 3, No.2, National University of Singapore. Available on-line at <http://www.cdtl.nus.edu.sg/brief/v3n2/default.htm>.

Chhem highlights why spoon-feeding is so popular, the limitations of spoon-feeding and why it is difficult to implement active learning methods. Chhem sees active learning methods as the bridge to enable independent learning and by putting the responsibility for learning on the student.

Kesten, Cyril, Independent Learning, Saskatchewan Department of Education Core Curriculum Investigation Project, 1987.

This paper is a study that was completed for the Saskatchewan Department of Education and addresses independent learning to include the actions the student needs to undertake to become an independent learner.

Saskatchewan Education. Understanding the Common Essential Learning's, Regina, SK: A Handbook for Teachers, Available on-line at <http://www.sasked.gov.sk.ca/docs/policy/cels/index.html> accessed on 28 February 2009.

This Handbook addresses the critical common essential learning's from understanding and action of them to the individual C.E.L.'s of communication, numeracy, critical and creative thinking, technological literacy, personal and social values and skills and independent learning. This handbook is a tool to help guide teachers in the incorporation of the C.E.L.'s into everyday instruction.

Learning Styles, Learn Effectively by Understanding Your Learning Preferences. Available at <http://www.mindtools.com/mneme1sty.html>, Accessed on-line on 3 March 2009.

This article defines the Felder and Silverman's Index of Learning Styles and using the learning style index. By understanding the different learning styles, it can help the student to foster further learning and helps teachers to foster a better learning environment. Also as one begins to understand how they learn, they can also focus on other learning styles to help expand themselves.

Skidmore, James M. and Laura Briggs. Introducing the Undergraduate Learner to Independent Learning Through Targeted Transferable Skills Acquisition. Available on-line at <http://net.educause.edu/ir/library/pdf/ELI07187.pdf>.

This briefing addresses independent learning activities applied to a German Cultural Awareness class along with the student feedback on these activities. It also shows the usefulness of a course management system to help organize and encourage independent learning for students whether the course is distance learning based or not. It emphasizes a task-based learning approach with feedback as well a learning strategy that provides enriched content and utilizes library resources.

Watkin, Neal, Using Information and Communication Technology to Promote Independent Learning, Information and Communication Technology, Engagement and Quality Learning. Available at <http://educationforum.ipbhost.com/index.php?showtopic=7136>. Accessed on 3 March 2009.

This article addresses independent learning and how to employ Information and Communication technology (ICT) to help support instruction that encourages independent learning. The author describes how power point and movie making, the two primary ICT activities discussed, can be used to achieve independent learning.

Additional Resources:

BBC News, 27 February 2002, "Public schools 'Spoon-Feed' Pupils". http://news.bbc.co.uk/2/hi/uk_news/education/1844620.stm

Conrad, R. and J. Donaldson. *Engaging the Online Learner. Activities for Creative Instruction*. San Francisco: Jossey-Bass, 2004.

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Dugdale, Christine. Information Spoon-Feeding in an Electronic Environment". <http://elpub.scix.net/data/works/att/97111.content.pdf>, Electronic Publishing '97 - New Models and Opportunities: Proceedings of an ICCC/IFIP conference held at the University of Kent, Kenterbury, UK, April 14-16 1997/ Edited by Fytton Rowland and Jack Meadows / ISBN 1-891365-00-21997

Holyoak, K. "The Pragmatics of Analogical Transfer". *The Psychology of Learning and Motivation*. Ed. Gordon H. Bower. Vol. 19. Toronto: Academic P, 1985. 59-87.

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Vipulnaik, "Doing it Oneself Versus Spoonfeeding" Available on-line at <http://whatisresearch.wordpress.com/2009/02/>.