

Comparison of Three Models of Instructional Design

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Throughout the history of education there have been many trends and philosophies of education and how it should be delivered. Instructional Design (ID) is one aspect of education that has been debated. According to Richey, Fields and Foxon (2000) instructional design is a systematic approach to instructional planning that involves a project team analyzing a problem situation, exploring a performance support or instructional solution, and then planning, implementing, evaluating and managing solutions. Another definition of instructional design is the process by which information is systematically mapped, categorized, and organized to facilitate the transmission of information and skills to people. (Winters, 1998). My own definition is similar to these two. I believe that first you have to have a belief foundation of how students learn. Then you have to look at what you want students to know and understand. Combine how students learn with the end goal and then begin to map out how to go about teaching these concepts in meaningful ways. There needs to be a system for doing this and one must be deliberate in planning so that nothing is done haphazardly. Beliefs about how students learn will determine the types of activities that are chosen for delivery of instruction and the proof of understanding.

There are many types of instructional design including the ADDIE Model, Understanding by Design (UbD) and the theories of Robert Gagne. Many instructional designers refer frequently to the ADDIE Model, but nobody seems to know where it came from. All agree that the acronym stands for analysis, design, development, implementation, and evaluation. The term does not appear in any of the expected reference sources such as dictionaries, encyclopedias, textbooks, histories of instructional design, or surveys of instructional design models. A survey of leading academics and practitioners led to some suggestions of original sources, but none proved to be correct. The conclusion is that the term ADDIE came into use, probably in the late

1980s, through word of mouth. It evolved as a label for the whole family of systematic instructional development models, but there is no original, authoritative source for it. (Molenda, 2003). During Analysis, the designer identifies the learning problem, the goals and objectives, the audience's needs, existing knowledge, and any other relevant characteristics. Analysis also considers the learning environment, any constraints, the delivery options, and the timeline for the project. The Design is a systematic process of specifying learning objectives. These are comprised of detailed storyboards or prototypes. The next phase is Development in which there is actual creation or production of the content and learning materials based on the Design phase. Next is Implementation. The plan is put into action and a procedure for training the learner and teacher is developed during this phase. Materials are distributed to the students and then the effectiveness of the training materials is evaluated. The last phase is Evaluation. It consists of formative and summative assessment. Formative assessment is present in each phase of the ADDIE process. Summative evaluation consist of tests designed for criterion-referenced items and providing opportunities for user feedback. Revisions are then made as necessary. (Dick, W., & Carey, L., 1996).

Understanding by Design is a framework for improving student achievement. According to Grant Wiggins and Jim McTighe (2006), the developers of UbD, the primary goal of education should be the development and deepening of student understanding. Students reveal their understanding when they are provided with complex, authentic opportunities to explain, interpret, apply, shift perspective, empathize, and self- assess. Wiggins and McTighe call these the "six facets". When these are applied to complex tasks, teachers can discern and better assess student understanding. Wiggins and McTighe contend that effective curriculum development reflects a three-stage design process called backward design. Backward design delays the

planning of classroom activities until goals have been clarified and assessments designed. This process helps to avoid the “twin sins” of traditional design which are “covering the textbook” and “activity oriented” teaching. (Wiggins, G., McTighe, J., 2006). Both of these traps have no clear priorities or purposes. Student and school performance gains are achieved through regular reviews of results, followed by targeted adjustments to curriculum and instruction. Teachers use feedback from students and other teachers to adjust approaches to design and teaching. The concept proposes an approach to curriculum designed to engage students in inquiry and uncovering ideas. The idea is a set of design standards for achieving quality control in curriculum and assessment designs. UbD proposes that we establish curricular priorities. When examining the standards, one would need to prioritize by three different categories. The Enduring Understandings are the important concepts that need to be learned. Then there are things that are important to know and do and then finally things that are worth being familiar with. Wiggins and McTighe (2006) warn that you do not choose, “this or that tactic to the exclusion of all others, but to expand and better target our teaching repertoire, based on a more careful consideration of what our learning goals imply.” (p. 10). There is no understanding without subject matter knowledge.

Robert Gagne was a leading theorist and researcher in the broad field of learning. His work *Principles of Instructional Design* (1988) is widely followed by program developers in business, industry, the military, and to a lesser extent in education. His events of instruction should be viewed as a subset of the larger process of instructional design. According to Gagne, these instructional events are applicable to all major classes of learning objectives. Interpretation and application will be affected, of course, by the particular learning situation at hand. This is true with the application of any element in any model of teaching. Gagne's events of instruction

are: 1. gain the student's attention, 2. inform the learning of the objectives, 3. stimulate recall of prior learning, 4. present stimulus material, 5. provide learner guidance, 6. elicit performance, 7. provide feedback, 8. assess performance, and 9. enhance retention transfer. He believed that stimulating recall is a prerequisite of learning (Reyes, 1990). Gagne advocates that real learning occurs if the knowledge is organized in a serial order hierarchy. The learning hierarchy is basic to any sequence in the curriculum. According to Gagne, the hierarchy serves the dual function of identifying and naming a collection of testable hypotheses to be used in collecting objective evidence to support the proposed sequence as well as describing the sequence. Since many of Gagne's studies were done in mathematics, a number of directed implications to teaching mathematics can be listed. Gagne determined that the "Narrow practice" of examples has a negative effect on retention. Simultaneously, no advantage in retention was found for increased variety of task example. This study has direct bearing on assigning appropriate variety and number of problems for practice in mathematics. The results also indicated that there is considerable loss in retention of subordinate knowledge in the sequence of instruction for acquiring knowledge. Thus, it seems desirable for teachers to direct most of their attention in test construction to general concepts and refrain from asking questions about factual information related to general concepts.

Gagne's results emphasized the importance of "what is learned" as opposed to "how it is learned" for problem solving performance. The guided discovery program using small steps, requires students to produce certain concepts actively. The discovery program, containing "large steps" may produce the same results in a less systematic method. The discovery method appears to gain its effectiveness from the fact that it requires the individual learner to restate the concepts that he will later use in solving new problems.

The three theories of instructional design are distinct yet have some similarities. ADDIE and UbD have the most in common. ADDIE's sequence is similar to UbD's backward design. ADDIE calls for analysis of the goals and objectives but ADDIE adds the consideration of background knowledge and the learning environment. The rest of the components of ADDIE, Development, Implementation and Evaluation are similar to UbD in that once materials are developed according to the goals and then lessons are developed and then evaluation occurs. Just as with UbD, the feedback is used to make any necessary revisions. Gagne's theory deals more with the order in which materials are taught. This may derive from his math background. It is more logical to teach some math skills in order. Even math problems themselves need to be completed in a certain order. One step must be completed correctly in order to progress to the next step. That seems to have influenced his theory. Gagne's focus was on what is learned as opposed to how it is learned. All three indicate that evidence of learning requires the learner to transfer the knowledge to other problems or situations.

Using a model for instructional design is vital to the structure of a lesson plan. If there is no plan or theory when writing lesson plans, then lessons are not focused and have no purpose. If there are no standards, or guidelines then there is no lesson plan, there is an agenda of activities for the day.

The ideal role of Media Specialists in the process of instructional design regardless of the one chosen would be that of co-planner or partner. It would be idyllic for the Media Specialist and teacher to work together to plan for instruction. The media specialist may have more of an overview of standards but the teacher has intimate knowledge of the standards for his grade level. Working together during planning times or a planning day to develop an understanding of what students should know by the end of a unit would be perfect for collaborative lessons and for

the gathering of materials. Working together as a part of the grade level or content area team would be lagniappe for a media specialist. The reality is that collaboration is sometimes difficult and the time for planning is not considered in the school calendar. Most teachers and media specialists meet casually and plan briefly. Lack of time to plan together makes collaborative teaching difficult. Speaking casually or communication by email is not true collaboration and is not ideal for a partner relationship.

My plan is to be involved with as much curriculum planning as possible. Throughout the year many teams plan monthly during the school day. That is a perfect time to be able to partner with teachers on a grade level to work with and understand the standards and work with essential questions. This type of planning and collaboration would lead to not only a more efficient gathering and purchasing of materials, but also planning for lessons to teach together. Media Specialists would like to work up to full partner but that would be almost impossible without planning times to be able to work together. Since Georgia has embraced Understanding by Design, most people in public schools have been trained in the concept of backward design. During training faculty meetings, I am able to work with various groups to get a feel for where they are and what I can do to help. Our GAPPS visit will be next year and we are starting to prepare for the process. We still have teachers that teach the way they have always taught for the last 30 years. One way I can help them is to send them materials and show how this material would fit in with a lesson that addresses the essential questions for the lesson or unit.

Regardless of the amount of planning time media specialists can have with a team of teachers, an instructional design is essential to the focus and planning of lessons for students. Choose a plan that addresses the needs of students and focuses on their understanding. The plan

must allow for flexibility. Teachers must have the ability to make changes in instruction so that students understand and learn.

References

- ADDIE based five-step method towards instructional design*. Retrieved February 10, 2008 from <http://fog.ccsf.cc.ca.us/~mmalacho/OnLine/ADDIE.html>
- ADDIE Model* Retrieved February 9, 2008 from <http://www.learning-theories.com/addie-model.html>
- Authentic education: *What is understanding by design?* (2004). Retrieved February 12, 2008 from <http://www.grantwiggins.org/ubd.html>
- Clark, D. Big dog's continuous process improvement page (1998). Retrieved February 10, 2008 from <http://www.nwlink.com/~donclark/perform/process.html>
- Dick W., & Carey, L. (1996). *The systematic design of instruction* (4th Ed.). New York: Harper Collins College Publishers.
- Hammond, G. *Multiple methods of assessment*. (2007). Retrieved February 10, 2008 from http://xnet.rrc.mb.ca/glenh/understanding_by_design.htm
- Lerner, R. (2002). *Concepts and theories of human development* (3rd ed.). New York: Random House.
- McTighe, J. & Brown, J.L. (2005). Differentiated instruction and educational standards: Is détente possible? *Theory into Practice*, 44(3), 264-244.
- Molenda, M. (2003). In search of the elusive ADDIE model. Retrieved February 10, 2008 from <http://www.ispi.org/publications/pitocs/piMay2003.htm/>.
- Reyes, D. (1990). Models of instruction. Retrieved February 10, 2008 from <http://search.ebscohost.com/login.aspx?direct=true&db=tfh&AN=9705100342&site=ehost-live>

Richey, R.C., Fields, D.C., & Foxon, M. (Eds.). (2000). *Instructional design competencies: The standards* (3rd ed.). Syracuse, NY: ERIC Clearinghouse on Information and Technology and the International Board of Standards for Training, Performance and Instruction.

Tomlinson, C. and McTighe, J. (2006). *Integrating differentiated instruction + understanding by design: Connecting content and kids*. Alexandria, VA: Association for Supervision and Curriculum Development.

Wiggins, G. & McTighe, J. (2006). *Understanding by design* (2nd ed.). Alexandria, VA: Association for Supervision and Curriculum Development.

Wilson, R.L.(1989). *The implications of selective learning models on teaching junior high school mathematics*. Retrieved February 10, 2008 from

<http://search.ebscohost.com/login.aspx?direct=true&db=tfh&AN=4718214&site=ehost-live>

Winters, E. (1998). Glossary Retrieved February 9, 2007 from

<http://www.ewinters.com/Glossary.html>