4.4 Instructional Models

Findings

✓ **Understanding by Design** (Wiggins and McTighe, 2005): This model suggests three stages for developing a curriculum.

  o **Stage 1: Identifying Desired Results**

  This stage refers to deciding what is important for the students to have as “enduring” understanding and what is worth it for students to become most familiar. It requires instructors to use their knowledge expertise to identify what is essential for students to understand within their domain (see [Figure 6](#))

  o **Stage 2: Determine Acceptable Evidence**

  In this stage, the instructor will need to decide on the best ways of getting information on students’ understandings and their learning outcomes. It is similar to the materials that students will submit on which they will be assessed.

  o **Stage 3: Planning Learning**:

  After defining desired results and planning learning, in this stage instructors will evaluate and plan what are the best teaching strategies to achieve learning goals and developing a coherent and effective instructional design (see [Figure 7](#))

✓ **Smith and Ragan Model** (Smith, & Ragan, 2005, p. 10):

The model has three major activities for developing a curriculum.

  o **Analysis and Assessment**: For this activity, the model involves four components in this process:

    ▪ **Contextual analysis**: In this component the designer or teacher will invest time in justifying why it is needed the instruction for helping students to reach their learning goals and describe the learning environment. The following are some components for a context analysis to consider:

      1. Needs Assessment: This first component is used to evaluate if the instruction and the desired learning experience will result in the initially proposed performance. This component has three types of assessment model as discussed by Smith and Ragan.
        • Problem Model: It refers to the need to correct a problem.
        • Innovation Model: It refers to the opportunity to learn something new.
        • Discrepancy Model: It refers to the evaluation of programs that are necessary or required.

      2. Description of the environment: The second component for the contextual analysis is to describe the environment where the learning experience will take place. The authors suggest 6 questions that can guide the description and help to organize it. The questions are focused on the teacher, the existing curricula, the equipment, facilities, organization and the educative system.
- **Analyzing the learner:** This component is focused on analyzing types of learners who are going to participate in the lesson, their physiological, affective, social, and cognitive characteristics, the authors indicate that these characteristics can be classified in four categories as shown in Table 2.

- **Analyzing the learning task:** Once it is clear what students should be able to do which refers to the needs assessment in the context analysis. Analyzing the learning task refers to preparing the learning task according to the following steps:

  1. Write the learning goal.
  2. Define the type of learnings in the goal.
  3. Find information-processing analysis of the proposed goal.
  4. Determine the type of learning of the prerequisites.
  5. Write learning objectives for the learning goal and each of the prerequisites.
  6. Write test specifications.

- **Planning for assessment:** It is recommended to think about the instruments for assessment while writing the learning outcomes for a lesson. The authors affirmed that these instruments are directly proportional to the high quality of the design of the learning objectives. A list of recommendations is provided for developing assessments (Smith & Ragan, 2005, p. 105)

  o **Instructional Strategies:** Based on Reigeluth, (1983), Smith and Ragan described the instructional strategies in three characteristics:
    1. Organizational Strategy
    2. Delivery Strategy
    3. Management Strategy

  o **Implementation, Management, and Evaluation:** In this component, the participation of stakeholders is more manifest in the application of the content, as well as the different stages that the learning task goes through while adopting it the content: awareness, Interest, evaluation, trial, adoption, and integration.

- **ARCS MODEL of Motivational Design model** (Keller, 1987)

  "The ARCS Model of Motivational Design was created by John Keller while he was researching ways to supplement the learning process with motivation. The model is based on Tolman's and Lewin's expectancy-value theory, which presumes that people are motivated to learn if there is value in the knowledge presented and if there is an optimistic expectation for success. The model consists of four main areas:" (Malik, 2014)

  o **Attention:** It refers to engage learners’ interest of learning new concepts/ideas, this first component has three categories:
    1. Perpetual Arousal: It is the use of surprise or uncertain situations to create curiosity. The learning activities are based on the learners’ perspective, for this category there is three elements to consider:
      - Concreteness: The use of relatable examples in the learning activity.
      - Incongruity and conflict: The stimulation of student’s interest by providing an opposite point of view.
      - Humor: The use of humor
2. Inquiry Arousal: It encourages thinking by giving difficult problems to students for them to brainstorm possible solutions, two elements are part of these components:
   • Participation: With this component, the learning activities are designed with hands-on experience.
   • Inquiry: It creates environments were critical thinking is developed by asking questions to learners to engage brainstorming.
3. Variability: It encourages the use of different teaching methods (Videos, audio, reading and lecture)

   o **Relevance:** According to the model, relevance is established from the use of language and examples. Six major strategies are proposed for this area:

   1. *Experience:* Engage the use of analogies, so student can use them for connect the knowledge with their experience. The students can also use their experience to establish analogies that can connect their learnings.
   2. *Present worth:* It refers to present the learning experience of how the knowledge will be applicable in their today or daily situations.
   3. *Future Usefulness:* it is the strategy to allow students to make a connection of how the learning may be applied in the near future.
   4. *Need Matching:* It enhances the achievement of striving behavior by providing opportunities “to achieve standards of excellence under a condition of moderate risk” (Keller, 1987, p. 4)
   5. *Modeling:* As an example, if the activity is self-paced, use those who finished first as deputy tutors.
   6. *Choice:* It provides the opportunity for students to organize their own works, as well as different methods to accomplish students’ goals.

   o **Confidence:**

   1. Learning Requirements: It is essential to state clearly to the students the learning outcomes for the class, as well as explains the evaluation criteria while evaluating their performance.
   2. Difficulty: Organize the levels of difficulties.
   3. Expectations: Include in the learning experience statements about the likelihood of success for the class and the amounts of effort required, as well as teach students how to develop a plan of work.
   4. Attributions: “Encourage students’ efforts to verbalize appropriate attribution for both success and failures” (Keller, 1987, p. 5).
   5. Self-confidence: “Help students to understand that the pursuit of excellence does not mean that anything short of perfection is a failure; learn to feel good about the genuine accomplishment.” (Keller, 1987, p. 5).

   o **Satisfaction:**

   1. Natural Consequences: Help students to use the acquire skills in a realistic setting and reinforce student’s intrinsic pride after accomplishing a difficult task verbally.
   2. Unexpected Rewards: “Rewards boring task with extrinsic, anticipated task” (Keller, 1987, p. 5).
3. Positive Outcomes: Provide motivating and informative feedback to students as well as give positive comments when the students have successful progress in their learnings.
5. Scheduling: It is essential to provide students with frequent reinforcements that help students to be more competent on the learning task

**Steps for ARCS model**

- *First Step defines:* Identify the motivational problem and classify it to be solved. “If the problem is one of improving the motivation appeal of instruction for a given audience, then it is appropriate to use the model” (Kelly, 1987, p. 6).
- *Second Step design:* In this step, it is necessary to create a list of all the potential motivational strategies for each goal. It can be done by brainstorming ideas. Further, each strategy is reviewed to decide which are more aligned with the learning objectives. The model provides 5 guidelines in order to do so:
  - Not take up too much instructional time
  - Not detract from the instructional objectives
  - Fall within the time and money constraints.
  - Be acceptable to the audience
  - Be compatible with the delivery system, including instructor’s style.

- *Third Step development:* In this step, educators create the materials that are required to integrate into the learning experience, based on the previous two steps.
- *Fourth Step evaluate:* In this last step, the evaluation of materials designed for motivation as well as materials intended for the learning outcomes.

**Instructional Recommendations**

- ✔ If the Smith and Ragan model is used, it is recommended to plan for summative evaluation which in conjunction with the assessment needs, previously indicated in the contextual analysis section. [Figure 8](#) shows the relationship between assessment needs and evaluation (Smith & Ragan, 2005, p. 10).
Figure 5. Summary of affordances and limitations of each formative feedback model


Figure 6. Backwards Design model stage 1 - Curricular priorities
Figure 7 the Smith and Ragan Model
Figure 8 Relationship between needs assessment and Evaluation

Figure 9 The matrix classroom stage 1
### Tables

**Table 1.** Relationship between components of the inverted classroom and students’ learning styles

<table>
<thead>
<tr>
<th>Method</th>
<th>Rethmanns and Garaia</th>
<th>Kolb</th>
<th>Myers-Briggs*</th>
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<tr>
<td></td>
<td>Dependent</td>
<td>Collaborative</td>
<td>Independent</td>
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<tr>
<td>Videotape</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
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<td>PowerPoint (on-line)</td>
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<tr>
<td>Labs</td>
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<tr>
<td>Worksheets and reviews (preclass)</td>
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<td>Old exams</td>
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</tr>
</tbody>
</table>

* I = Intuitive, E = Extroverted, S = Sensing, N = Intuitive, F = Feeling, T = Thinking, J = Judging, P = Perceiving.

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**Diagram**

### Similarities
- Sensory Capacities
- Information Processing
- Types and Conditions of Learning

### Differences
- Aptitudes
- Cognitive Styles
- Psychosocial Traits
- Gender, Ethnicity, & Racial Group

### Stable
- Development Processes
- Intellectual
- Language
- Psychosocial
- Moral
- Other

### Changing
- Development State
- Intellectual
- Other
- Prior Learning
- General
- Specific

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**Table 2.** Smith and Ragan model, four categories of learner characteristics.