

## **Comparative Analysis between System Approach, Kemp, and ASSURE Instructional Design Models**

**By**

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### **ABSTRACT**

*Nowadays, teachers face a lot of challenges of their being held accountable for their students' academic achievement and the existing chances to teach beyond traditional methods through the use of innovative instructional technology and media. However, Instructional Design Models help teachers to provide systematic way or approach for effective utilization and implementation of educational media and technology in teaching. Therefore, this paper gives an overview of three Instructional Design Models (System Approach, Kemp, and ASSURE Instructional Design Models) followed by comparison and contrasting differences between the models. So, it might be helpful for teachers to select more appropriate model for integrating technological gadgets into their teaching.*

### **1.1 INTRODUCTION**

Instructional design is defined as the systematic way of or process of transmitting general principles of learning and instruction into plan for instructional materials and learning (Branch, 1998). However, Model could be defined as “a way of doing something; an explicit presentation of a reality, it is an example or pattern that prescribes relationship in a normative sense” (Branch, 1998). Thus, Instructional design models give structure and meaning to a problem, giving chance to a designer to negotiate the design task by using a process or systematic method (Fauser, Henry, & Norman, 2006). Andrews and Goodson (1980) stated that instructional design models serve three purposes;

- i. Improving learning and instruction by means of the problem solving and feedback characteristics of the systematic approach.
- ii. Improving management of instructional design and development by means of the monitoring and control function of the systematic approach.
- iii. Improving evaluation process by means of the design components and sequence of events, including the feedback and revision of events.

There are many instructional design models initiated by scholars of Instructional Technology such as System Approach Model by Dick & Cary, Kemp Model by Kemp, Smellie and Szumski, ASSURE Model by Smaldino, and many others. In this paper the above mentioned three instructional design models have been selected for comparison.

## 2.1 SYSTEM APPROACH INSTRUCTIONAL DESIGN MODEL

System approach model is among the most influential ID models. It is like many other ID models as it involved with the core elements of analysis, design, development, implementation, and evaluation (Dick & Cary, 2005). System approach model is not only based on theory and research. But it is also based on a considerable amount of practical experiences in its application.

The system approach model is more complicated than others some times, because its approaches were based from the five core elements which were broken down into more various steps with different terminologies (Brach & Gastefon, 2002).

### 2.1.1 Components of System Approach Instructional Design Model and Their Inter Dependency

This model consists of ten inter-dependent components in procedural or sequential steps. Each component depends on another one as shown by the black arrow lines. The components or boxes represent theories, procedures, and techniques employed by the instructional designer to design, to develop, to evaluate and to revise instruction. While the white arrows of the 1.1 figure represents formative evaluation points and instructional revision, which originate from reexamination of the instructional analysis's validity and entry behavior of learners.

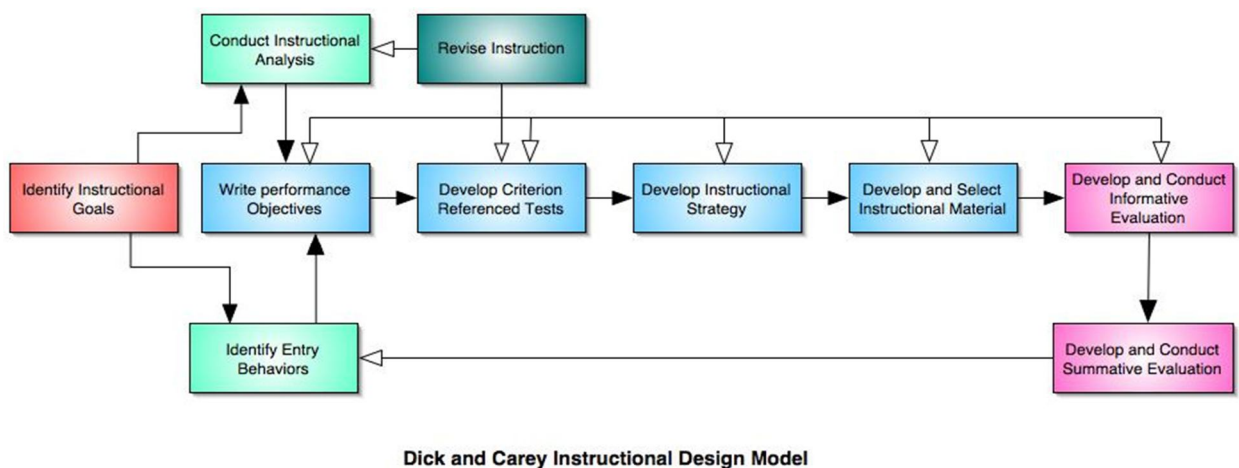


Figure 1.1

Illustration of the Components of System Approach Model and Their Inter Relationship  
Dick and Carry, (2005)

The components of the model are (a) assess needs to help identify learning goals, (b) conduct instructional analysis (c) analyze learners and contexts, (d) write performance objectives, (e) develop assessment instrument, (f) develop instructional strategies, (g) develop and select instructional materials, (h) design and conduct formative evaluation, (i) revise instructional base from formative evaluation, and (g) design and conduct summative evaluation (Dick & Cary, 2005).

**Identify Instructional Goal:** this is the first component of the model, which means determining what the instructor expects from the learners to be able to do after the instruction. The instructional goal can be derived from various ways; it can be derived from a list of goals, from a need assessment, from practical experience with students' learning difficulties, and from analysis of people where they are doing a job, or from other sources for new instruction (Dick & Cary, 2005).

**Conduct Instructional Analysis:** this refers to a procedure applied by the instructor to identify the level of audience's skills, knowledge, attitudes toward the new instruction he is going to conduct. Therefore, the instructor must carefully examine and create step by step task description to help learners achieve instructional goals (Dick & Cary, 2005).

**Analyze Learners and Contexts:** these components deal with the process of instructional analysis, including the process of collecting information from the learners, concerning their entry behavior, characteristics, prior knowledge, skills and attitudes, academic motivation and learning preferences. On the other hand, the analysis of the learning context determines *what is* and *what should be*. What is refers to a review of the setting in which the instruction will take place, while what should be is facilities, equipment, and resources that adequately support the intended instruction (Dick & Carry, 2005). Therefore, the instructor should select appropriate environment that can support teaching and learning process by considering the following elements:

1. The compatibility of the site with instructional requirements
2. Adaptability of the site for stimulating aspects of the work place or performance site
3. The adaptability of the site for using a variety of instructional strategies and training delivery approaches and
4. The constraints present that may affect the design and delivery of the instruction.

**Write Performance Objective:** the aim of this is translating the needs and goals into specific objective, by writing precise statement of what the learners will be able to do after the completion of the instruction (Dick & Cary, 2005). A well stated instruction objective must fulfill either one or all of the following components:

- 1- **Performance:** what students will do to indicate that they have learned
- 2- **Condition:** the circumstance under which the students are expected to perform
- 3- **Criteria:** the standard that design the acceptable performance

**Develop Assessment Instrument:** the purpose of this is to measure the performance objectives of the learners. Knowing the behavior of each objective, condition, and criteria gives guidance to designer on knowing how to select and determine an assessment instrument that can measure performance objectives. Both objective and assessment are dependent on each other (Dick & Cary, 2005). There are basically four types of test that designer may create including the entry behavior test, pre-test, practice or rehearsal test, and post -test.

- 1- Entry Behavior Test is given to learners before they begin instruction. this test assess the learners' mastery of pre-requisite skills that learners must have already mastered before beginning instruction.
- 2- Pre-test is administered to learners before they begin the instruction to determine whether they have previously mastered some or all of the skills that are to be included in the instruction. The reason for this test is efficiency, if all the skills have been mastered, then the instruction is not needed. On the other hand, if only part of the skills have been mastered, then the pre-test data enable the designer to be most efficient in the creation of instruction. Since both entry behavior test and pre-test are administered prior to instruction, they are often combined into one instrument.
- 3- Practice Test, the purpose of this test is to provide active participation of learners during the instruction. Practice test enables learners to rehearse new knowledge and skills and to judge for themselves their level of understanding and skill. Instructors use students' responses from practice test to provide corrective feedback and to monitor the pace of instruction.
- 4- Post Tests are administered after the instruction, and they are parallel to pre- test except they do not include items in entry behavior. Post-test measure objectives included in the

instruction. also it is very important for designer to consider which test item is more appropriate for his instructional objectives.

**Develop Instructional Strategies:**based on the information from the five preceding steps instructor will identify the strategy that he will use in his instruction to achieve his instructional objective. The strategy will emphasize the components to poster student learning including pre-instructional activities, presentation of content, learner participation, assessment, and follow-through activities. The strategy will be based on current theories of learning and results of learning research, the characteristics of the media that will be used to deliver the instruction, content to be taught, and the characteristics of the learners who will participate in the instruction (Dick & Cary, 2005).

**Develop and Select Instructional Materials:**instructional materials are refer to any form of instruction like instructor's guide, students' modules, overhead transparencies, video tape, computer base multimedia formats and web page distance learning (Dick & Cary, 2005). Choice and decision of developing and selection instructional materials depends on the type of learning to be taught, availability of existing relevant materials, and the developmental sources available to the instructor. The designer can continue revising and improving instructional materials during the evaluation process (Dick & Cary, 2005).

**Design and Conduct Formative Evaluation:**formative evaluation is an evaluation designed to collect data and information that is used to improve a program or produce it; it is conducted during the development of the program (Sells &Richy, 1994). The purpose of formative evaluation in this model is to provide guidelines for a designer to improve the instruction. There are three types of evaluation: one to one evaluation, small group evaluation, and field evaluation. Each one of the evaluation gives a designer different types of information that can be used to improve the instruction (Dick & Cary, 2005).

**Revise Instruction Base from Formative Evaluation:**this means revising instruction by making it as effective as possible for larger number of students. Data from formative evaluation are summarized and interpreted to identify difficulties experienced by the learners in achieving the instructional objectivesand to relate these difficulties to specific deficiencies of the materials used. This is the final stage of the design process, and the first step for interaction process (Dick & Cary, 2005).

**Revise and Conduct Summative Evaluation:**summative evaluation is any evaluation designed and used after the instructional program has been implemented and formative evaluation completed (Seels&Rochey, 1994). Dick and Cary (2005) reported that summative evaluation is considered as culminating evaluation for examining instructional effectiveness. It is not part of the nine basic component of system approach model. Also it is not an integral part of it, because the designer of the instruction is not involved in the process.

## 2.2 KEMP INSTRUCTIONAL DESIGN MODEL

The Kemp model defines nine different components of an instructional design, and at the same time adopts a continuous implementation or evaluation model. The Kemp model emphasizes interdependencies of each step in the process, highlights the importance of the evaluation, and it recognizes more environmental factors in educational settings (resource and support, such as budget, facilities, time, equipment, personnel and materials). The Kemp model is particularly useful for developing instructional program that mixes technology, pedagogy, and content to deliver effective, reliable and efficient learning.

The model starts with the answer to four questions:

- i. For whom is the program being developed? (nature of the learners)
- ii. What do you want the individual to learn or be able to do? (objectives)

iii. How the subject content or skills is best learn? (teaching/learning methods and activities with resources)

iv. How do you determine the extent to which the learning has been achieved? (Evaluation).

Thus, Kemp model of instruction consists of nine elements arranged in a circular manner in a form of an oval shape, see figure 2.1. The elements of the model are: (a) instructional program identification, and goal specification of an instructional course, (b) examination of learners' characteristics based on the instructional decisions, (c) subject content identification with task analysis related to goals and purposes, (d) instructional objective specification, (e) instructional unit in arranged, in logical sequential order of learning, (f) instructional strategies design to meet the mastery of lesson objectives, (g) plan and develop instruction, (h) evaluate instruments for measuring course objectives, finally (i) resource selection for instruction and learning activities.

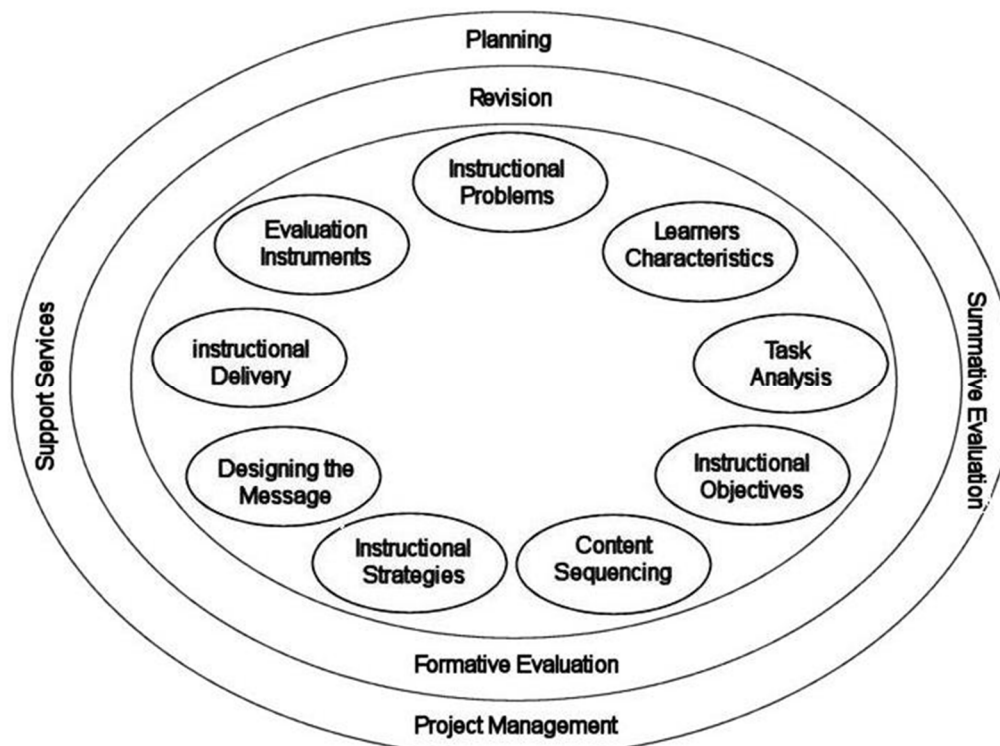


Figure 2.1 components of Kemp Model  
Kemp et al (2006)

Based on the above figure we can conclude that Kemp Instructional Design Model has the following characteristics:

- 1- All elements are interdependent.
- 2- All elements can be performed simultaneously.
- 3- Developer can start anywhere.
- 4- Learning needs, goals, priorities, and constraints determine the instructional solution.

### 2.3 ASSURE INSTRUCTIONAL DESIGN MODEL

ASSURE (is an acronym of Analyze, State objectives, Select materials, Utilize materials, Require learner responses, Evaluate) model is among ISD models. It consists of step by step approaches to create a lesson that effectively integrate the use of technology and media to improve students'



learning (Smaldino, 1996). Also Smaldino (1996) believed that a lesson design with ASSURE model is relevant to the National Education Technology Standards for teachers, and curriculum standard from the local to national level. In addition to that, ASSURE model uses a standard research based approach to lesson design which is most likely suitable to any school or district lesson plan pattern (Smaldin et al, 1996).

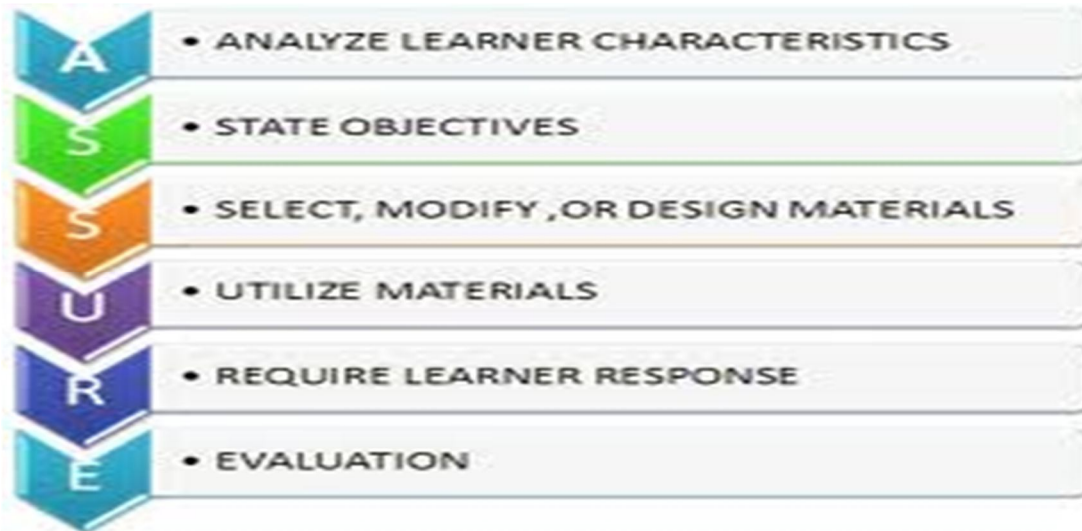


Figure 3.1 Steps or components of ASSURE model  
Smaldino, (1996)

**Analyze Learners:** this is the first step of the model. It means identifying and analyzing learners' characteristics with respect to the learning outcomes. The instructor will analyze learners based on three features:

- 1- General characteristics, which include the number of students at the class, age, level, gender, socio economic status of the students, exceptionality, cultural and ethical diversity of the learners.
- 2- Entry competencies, this means the description of knowledge which the teacher expects the learners have known. Like knowledge, skills and attitudes about the topic.
- 3- Learning style, this refers to psychological differences of the learners that determine how a person perceives, interacts with and responds emotionally to the learning environment. This includes multiple intelligence, perceptual preference and strength, information processing habits (concrete sequential learners, concrete random, abstract sequential and random sequential learners), motivation, and physiological.

**State Standards and Objectives:**the teachers should state learning outcomes expected from each student to demonstrate after the completion of the instruction. In most cases learning objectives are derived from curriculum and technology standards (Smaldino, 1996). Well stated objective names the learners for whom the objective is intended, the behavior or performance will be observable, and the degree to which the new knowledge or skill must be mastered. Smaldino (1996) refers this as ABCD objectives the acronyms of Audience, Behavior, Condition and Degree.

**Select Strategies, Technology, Media, and Materials:**after the instructor has analyzed the learners and he has stated standard learning objectives, the next step building a bridge between the learners and the objectives. Therefore, the instructor should decide which method is more appropriate for learners and learning objectives. Should he use teacher centered method or students centered method or the combination of the two. Thereafter, the instructor will move on to decide what

technology, media and materials will be used for the lesson. The media like photo, multimedia, video, computer, bearing in mind that any one of them chosen by the instructor will cooperate with learners and objectives. Therefore, Smaldino (1996) suggested the following criteria for selecting technology and media:

- 1- Alignment with standard outcome and objective
- 2- Accurate to the current information
- 3- Age appropriateness
- 4- Interest level and engagement
- 5- Technical quality
- 6- Ease for use
- 7- Bias free
- 8- User guide and direction

**Utilize Technology, Media, and Materials:** this step involve the role of teacher on planning how he is going to utilize technology, media, and materials to help students achieve the learning objectives. In this matter, the teachers will consider 5P which means; preview the materials, prepare the materials, prepare the environment, prepare the learners, and provide the learning experience.

**Evaluate and Revise:** this is the final step of this model, where by the teacher evaluate the impact of the lesson on students' learning. This evaluation is not limited to determine students' achievement of the lesson outcomes, but also to examine the entire instructional process and the impact of using technology and media in the lesson. Wherever there is discrepancy between learning and objective, the teacher will revise the lesson plan to address the area of concern (Smaldino, 1996).

### 3.1 COMPARISON AND CONTRASTING THE THREE INSTRUCTIONAL DESIGN MODELS

This section gives an account of observed similarities and differences in the characteristics and qualities analyzed from the above three models' process description and presentation. But, first of all, the all three models were carefully designed based on the three learning theories (behaviorism, cognitivism, and constructivism), researches, and practices. However, the followings were noted: (a) the use of visuals that are suitable for the model definition and process, (b) general structure for each model with its goals and purposes, (c) the evaluation processes, and (d) the role of team collaboration.

### 3.2 The Use of Visuals to Represent the Model Structures and Function

Each of the above models has a process or system which is well represented and supported with diagrams by the authors. (See figure 1.1, 2.1, and 3.1). What differentiates the models from one another is the layout for the individual component as it applies and relates to each other, represented through dynamic illustration. For instance, in the Kemp Instructional Design Model, the use of non-connecting lines shows that the components do not relate to each other. While in the System Approach Instructional Design Model diagram show one way linear application of the design stage, as it indicates sequence and interdependency between the components. However, ASSURE models involved in the sequence of its steps.

### 3.3 Conventional Structure of the Instructional Design Models

The all three models have basic elements of ID which is normally referred as ADDIE (Analysis, Design, Development, Implementation, and Evaluation). Brant (2001) indicated that System

ApproachModel is based on the universal core elements of ADDIE. Following tables clarify relevance of ADDIE model on the three Instructional Design Models components:

Table 3.1

Relevant components of System Approach IDM in comparison to ADDIE

<b>Components of System Approach IDM</b>	<b>Their Equivalents in ADDIE</b>
1- Need assessment to identify the goal	
2- Conduct instructional analysis	
3- Analyze learners and contexts	Analyze
4- Write performance of objectives	
5- Develop assessment instruments	Develop
6- Develop instructional strategies	Design
7- Develop and select instructional materials	Implement
8- Design and conduct formative evaluation	
9- Revise instruction based on formative evaluation	Evaluate
10- Design and conduct summative evaluation	

Table 3.2

Relevant components of Dick and Cary model in compared to ADDIE

<b>Components of Kemp IDM</b>	<b>Their Equivalents from ADDIE</b>
1- Instructional problems	
2- Learner characteristics	
3- Task analysis	Analyze
4- Instructional objectives	
5- Content sequence	
6- Instructional strategies	Design
7- Design the message	
8- Development of instruction	Develop
9- Implementation (this located between the rounds of the circle)	Implement
10- Evaluation instruments	Evaluate



Table 3.3  
The Relevance of ASSURE ID Min Comparison to ADDIE

<b>Steps of ASSURE IDM</b>	<b>Their Equivalents in ADDIE</b>
1- Analyze learners	Analyze
2- State standard objectives	
3- Select strategies	Design
4- Utilize technology, media and materials	Develop and Implement
5- Require learner participation	
Evaluate and revise	Evaluate

### 3.4 Evaluation process

All of the Instructional Design Models offer the component of evaluation. System Approach Instructional Design Model offers both formative and summative evaluation. Kemp model has formative evaluation, summative evaluation, and confirmation evaluation. Formative evaluation is conducted during the instruction, while summative evaluation and confirmation evaluation are conducted at the end of the instruction by team members (Seels & Richey, 1994). On the other hand, ASSURE model offers only formative evaluation.

### 3.5 The Role of Team Collaboration

Each of the Instructional Design Model supports the concept of individual, team collaboration and project management concern, but they differ at various stages of the design process. Team work concept in System Approach Model relies on group (manager and specialists) collaboration of skills for the production of final product (Dick and Cary, 2002). Sometimes the instructor alone can also be a team, but on condition that he has all the skills needed for the project (Dick & Cary, 2002). The Kemp model assumes that the designer must have strong-meta cognitive and leadership skills in order to be able to manage and revise the changes during development process (Ross & Kemp, 2002). However, the ASSURE model mainly focus on the individual (instructor or a teachers), also he should be able to handle the process of instruction implementation in an effective manner (Smaldino, 1996). Isman (2007) believe that instructor must have experience and competency in handling students' active participation in learning which will gave them ability to be highly motivated in learning.

### 4.1 CONCLUSION

The three instructional design models, namely System Approach, Kemp and ASSURE Models were briefly discussed in this paper. Each model gives gigantic contribution and guidance which is applicable in the instructional process, depending in the instructions' needs, purposes, and settings. The feature and design for each model were compared and contrasted. Some similarities and differences were found during the analysis.

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