Title: Combined Instructional Theory

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Abstract

This theory of instruction was written to show a different perspective into several instructional theories. It assumes that various types of instructions have really similar, common sub components gathered under basic elements of instruction and Gagné showed these basic elements as events. Simple words were used to demonstrate an understandable way for the audience of this theory. First, underlying facts were explained to form a comprehensible growth in the theory so that people can see where the assumptions are coming from. After that, various methods were placed under each event according to their usage in types of knowledge. This led to a combined instructional theory.
The theory will be gone over in the order given in the written document. A visual presentation tool will be used to show important points. During the presentation and after the presentation people will be given opportunities to ask questions and make comments. People may be asked questions to increase the motivation.

**Discussion Questions:**

1. What are the some other types of knowledge?
2. Are there any other type of learning?
3. Where this theory can be used? Is it directly applicable to school settings?
Combined Instructional Theory

One theory for instruction

Semir al Öncü
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Combined Instructional Theory

One theory for instruction

Introduction

When the present theories of instruction are examined, a variety of representations can be seen. There are so many instructional theories that adding another would be just a little book taken for a library. Every practitioner of this field probably has a picture of instruction in his/her mind in which he/she is an instructor and is teaching by using his/her own methods. A concern was always coming into mind whether these statements, which were already written by others, should be reaffirmed. Reading Snelbecker’s (1999) words were somewhat a relief for this concern.

Perhaps we can learn something from this advertising theme. Perhaps what we need to do in describing theories and research reports is to identify the “added value” that the respective theory or research results provide us. We need not claim that we have all the answers for a theoretical issue or a practical matter, but we properly can claim credit for having addressed at least some aspects of those matters.

This theory of instruction was written to show a different perspective into several instructional theories. It assumes that various types of instructions have really similar, common sub components gathered under basic elements of instruction and Gagné was able to show these basic elements as events.
Simple words were used to demonstrate an understandable way for the audience of this theory. First, underlying facts were explained to form a comprehensible growth in the theory so that the audience can see where the assumptions are coming throughout the theory. Snelbecker (1999) touches this very well.

To minimize … misuses of theories, practitioners should note the topics covered and the kinds of instruction primarily addressed by the theory, as well as, the way the theory is supposed to be used (according to the theory authors) in designing instruction. (p.45)

After that, various methods were placed under each event according to their usage in types of knowledge which led to a combined instructional theory.

**Values**

My values drawing the roots of this theory are as follows. Since the theory aims to see the common aspects in different types of teachings, the values cover a broad range of conceptions in educational settings.

Instructional tools and materials should…

…serve to the exact needs of learners and also the teachers.

…should assist in learning.

…help the students with disabilities as well.

…be multifunctional.

…be as economic as possible.

…be easily reproducible.
Learner should…

…provide feedback to both the other learners and instructor.

…develop an understanding of exploration with the guidance of instructor.

…be able to develop knowledge with understanding.

…collaborate with each other and share their findings from the education.

…elaborate on his/her own thinking.

…be prepared to a life long learning activity.

…learn how to apply the learnt things to the real life situations.

Therefore the education will pay its expense.

Instructor should…

…be a bridge between the research, learning and practice.

…put together various ideas into instruction.

…behave every student equally.

…provide improving feedback to the learners.

…consider to teach in divergent thoughts and encourage multiple perspectives.

…motivate his/her students to effectively learn information and improve that information in their minds.
Medium should…

…serve as a place that students feels themselves in a place where learning occurs. (Motivation)

…support the learning activities by preventing students from noise, hot-cold, and distracting factors.

…support the communication between the students and instructor as well as among the students.

Methods should…

…consider the learning activity as a system. Instructors, learners, tools, medium, etc. should be some of the components of that system.

…consider the differences of students in aptitudes.

…be generalizable to all learner categories (age, ability, etc.)

…also encourage learning techniques as well as instructions. Therefore students can learn without the assistance of the instructors.

**Components of Theory**

**Gagné’s Nine Events**

The roots of this theory are based on Gagné’s nine events and the learning domains. The first emphasize in Gagné’s events is a sequential explanation of instruction. He gives a framework of methods from general to specific. He thinks of an instruction as the application of methods. What this theory tries to do is to put different types of knowledge into the Gagné’s nine events in the illumination of instructional taxonomies (types of
learning). Now, how instructional taxonomies and types of knowledge are considered in this theory of instruction.

**Types of Learning**

Reigeluth (1999) compares the existing taxonomies and tries to come up with general terms that cover each taxonomy. He presents Bloom, Gagné, Ausubel, Anderson, Merrill’s and his taxonomies. He gathers them into the following categories: *memorize information, understand relationships, apply skills, and apply generic skills.*

![Diagram](image1.png)

**Figure 1.** A general look at the Instructional taxonomies.
These categories simply attempt to group *how* learners learn. The categories can be separately described; however they also have some features in common, description of which exceeds the scope of this article.

**Types of Knowledge**

Knowledge presents *what* learners learn. There are five different types of knowledge spelled out by different people:

**Information:** These include names as well as facts that do not require understanding. Names of objects are a kind of information. Facts are statements that show an “association between two things” (Morrison, Ross, & Kemp, 2001). In order to learn information, *memorization* is sufficient.

**Concepts:** Concepts represent the categories of objects. Human conceptualize the names in their mind connecting one to another. These can be stated general names of other sub-names. Examples would be fruit, automobile, bird, fraction, etc. In order to learn concepts, people are required to memorize the subcategories of concepts and understand their relationships to position them into the correct place in their minds.

**Principles:** Principles are the statements that show cause and effect relationships. If something can be explained because that something else happened, the association between them can be described in a principle. Examples would include:

- If the temperature of air increases, the hot air gains altitude against the cold air.
• Transmitting energy in high voltage configuration reduces the power lost over the transmission cables since the current floating over the wires decreases.

**Procedures:** Procedures are steps involved in construction of some products, or completion of a task. Steps in procedures are defined according to tasks, which may not be sequential, as well as they can be. It can be both physical, which requires physical applications, and mental, which is a combination of activities in brain (Reigeluth, 1997b). Examples include:

- Installing software into a computer.
- Filling gas into a fuel tank.
- Multiplying two numbers.
- Opening a bank account on the internet.

**Interpersonal Skills & Attitudes:** “Viewing attitudes as tools created to implement a unique personal strategy”. Kamradt & Kamradt (1999) is a key to personal development. Interpersonal skills mainly cover building communication skills. The primary focus of this kind of knowledge is applying generic skills. However, students should master application of all kinds of learning, in order to be successful in building interpersonal skills & attitudes. Examples would include:
• In the sales department of a store, communicating to a customer in a trial conversation.

• How to stay in queue in a school canteen as a student.

• Working in the management of a village.

Now if we combine the types of learning and the types of information we could conclude at the following matrix in Figure 2. In the matrix, X’s show the required type of learning to be mastered in order to be successful in learning each type of knowledge.
### Flow Chart

The flow of instruction in a class is similar to a computer program. Instruction can be directed or guided by certain criteria (conditions). According to each action taken in Gagné’s events (and in the sub components of events), certain results (outcomes) can be observed. An instruction starts with a general, overall condition, and ends with an overall outcome. Figure 3 shows Gagné’s nine events as a flow chart which an instructional plan should include.

#### Figure 2 Analogy of types of learning and types of knowledge.

<table>
<thead>
<tr>
<th>Types of Learning</th>
<th>Information</th>
<th>Concepts</th>
<th>Principles</th>
<th>Procedures</th>
<th>Interpersonal Skills &amp; Attitudes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply Generic Skills</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Apply Skills</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Understand Relationships</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Memorize Information</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Conditions can be interpreted as decision points. And, the events can be interpreted as processes. The decision points give emphasis to what methods should be selected. And, the processes illustrate the way in which methods should be dealt with.

As you see there are some arrows coming from the “Provide Feedback” part. From “Present the Content” to “Provide Feedback”, events should be repeated. This is not always the situation, however. The instructor or whoever is presenting the instruction should consider the present status and conditions during the class.
Figure 3. Gagné’s nine events in a flow chart (Gagné, Briggs, & Wager, 1988)
Methods are evaluated according to *conditions*. In other words, conditions are some sort of statements next to which methods are selected to be used. Usually for each method, a condition should be described in order to clarify where to use, what to use, when to use that certain method. The example settings were provided at the end to give an idea of how *procedure learning* looks like.

Here are the methods this theory will engage in teaching instruction:

1. **Gain Attention**

Gaining attention represents the phase that the instructor motivates the students for the desired learning. Their attention on a certain topic, which is the exposed, targeted topic, is important since if they lost it they will not be able to follow the pursuing parts in the topic. This phase of the instruction is pretty the same for all types of knowledge. Therefore each type of learning should include the same methods to gain the learners attention. The followings are the methods that can be used to get attention.

- Use quick incentive changes by connecting the target lesson to the real life. If students do not see a benefit from the instruction, they do not have any reason to learn it. Providing good connections to real life situations is important.
- Showing a complete product (for physical tasks especially; for virtual tasks, the complete product could be described in implicit terms) encourage students to study the topic. Sometimes students are disencouraged because either the task is difficult or takes too long to complete. But envisioning the result can strongly motivate the learners and give them the message that they can do that.

- Try to come up with ideas that are relevant to the learners in order to appeal to their interests: Some topics could be perceived as boring by the learners; the learners may not like the topic. In these kinds of situations, presenting relevant thoughts would work well. Otherwise, the instructor may loose the concentration of the students at the beginning of the lesson.

- Ask questions about the topic learners are going to experience. Asking questions means interaction. The instructor gets the chance of stating that he/she expects a direct response from the students which will force learners to act in response. If the instructor or the learning environment keeps the learners interacting, then it means the students pay attention and are ready to take the next step in the lesson.

²State Objectives

Objectives narrate what learners will be able to do after the instruction. They are usually given in bulleted lists. Except distance learning, however, instructors should provide learners with objectives in a way that is fluent, that does not seem odd as being counted
like separate statements. They should be embedded into the instructions pleasingly well. Most students would be better capable of achieving the learning if they are able to see what they are required to learn. So it is important to state the objectives at the beginning of the lesson right after the attention. It does not hurt to imply again that if the instructor does not provide attention focusing before emitting the objectives, the students will not benefit either from the lesson, or from the objectives.

- Instructor should not necessarily specify the objectives to the students.

This phase can be done in conjunction with the previous phase and the questions that are asked on the previous page can be presented for either purpose.

3 Remind Prior Learning

It is important to note that people always try to find similarities of objects (or whatever term you imagine) to the other objects in order to better understand or learn them. It also helps keep information longer in the memory which means some sort of effectiveness of learning. This phase can be done in conjunction with the first and the second phases.

- Remind the previously learned knowledge. Although information is a single name or an association, it is possible that it relates to other names or facts. So it may be a kind of optional method to relate to the previous knowledge while teaching information. However, while teaching other kinds of information it has a significant place. For example, concepts are
recognized as categories. The students should what else goes into the category gives students a broad imagination of the concept. For interpersonal skills, students build their understandings over the past information. Doubtlessly they will try to find associations in order infer from those associations.

- After reminding some of the associations, ask questions. No matter what kind of knowledge you are teaching, questioning technique is always a good tool to use. By asking questions you will request students to generate the associations, remember past knowledge, and built relationships.

- For procedure learning, previous skills could be reminded and the similarities can be shown. For example, it is very helpful to remind students how to add two numbers in order to teach how to add three numbers. This will help them skip some of the phases that do need to be gone over again.

**Present the Content**

There are several ways in which it is possible to present the knowledge. This part is the toughest part of the instruction. Massive data are given in this part. Therefore it needs to be connected (like a loop) with the fifth, sixth, and seventh phases. Each type of knowledge may have different methods in order to present the content.
- For the big classes it is good to divide the class into groups. This way, you will provide more opportunity for learners to learn from each other. Assign each group a volunteer leader. Therefore you will better seize the classroom.

- As a general rule of teaching something, describe it if you are not using an explorative method for students. Reigeluth (1997a) counts presentation in routine tactics.

  If you are teaching procedure focus on the actions that should be performed by the learners, and also focus on the order in which the steps should be gone over.

- Except information, use general examples of the knowledge in order for learners to see what you mean by the description. You may increase the level of detail as you proceed in the presentation.

  For names and facts, which we call information, showing the information itself is enough since you are working on a single item. If you do not have a representation of the material you may show its pictures or models (Morrison et al., 2001).
- Non-examples should be given where applicable in order for learners to discriminate the knowledge they are experiencing from the ones that cannot be interpreted in the same way.

- Demonstration is one of the powerful methods in instruction if you are not using exploratory methods, and you are teaching either procedures, or interpersonal skills & attitudes.

Both Reigeluth (1997b) and Merrill (1999) states demonstration in their procedure learning applications. Reigeluth uses the demonstration as a kind of example for procedure learning. He also emphasizes that each example should be as divergent as possible. Merrill use the term hands off demonstration, in which learners are just watchers of the event that is being performed by instructor or by other means; for example guest experts (although he represents this in a computer aided instruction it is useful to express here).

Demonstration is important for interpersonal skills and attitudes as well. Morrison et al. (2001) stress that attitudes are taught in a similar way to the interpersonal skills (that is why we have grouped them in the same category).

Kamradt & Kamradt (1999) suggests a behaviorist approach, which we can generalize to interpersonal skills, to teach attitudes. Give a stimulus
that is a statement of an attitude and wait for students to respond to this attitude by showing whether they liked (accepted) it or not. The statement should slightly direct students to the targeted attitude and be close to the learners’ existing attitude. If they reject the attitude give another one that is closer to the existing attitude. Kamradt & Kamradt (1999) further assert that when learners reject try to explain the necessity of the attitude. If learners insist on saying this attitude is dangerous or impossible, give a demonstration which we just explained above.

5 Provide Learner with Guidance

Just presenting information may not be effective if students cannot follow it. Learner waits for clues to capture the message given in the instruction. Instructors should use guidance methods when appropriate.

- Use of mnemonics (Reigeluth, 1997b) as reminders.

- Present information in chunks (Reigeluth, 98). This method is especially helpful if you are teaching information and concepts.

- Use repetitions (Reigeluth, 98).

- Use algorithms, “a set of steps for the learner to use in checking to see if all of the critical characteristics are present”(Reigeluth, 1997a)(p.7).

- Use flowcharts.
If you are teaching procedures, flowcharts facilitate to show the order of steps.

If you are teaching interpersonal skills and attitudes, flowcharts are especially helpful while showing the decision points.

- Use visual aids where applicable. Present the information in the forms of pictures, photos, and models will provide learners with a mental model in their minds.

Guidance is especially important for learners that are taught in an exploratory way. There are three activities which can be counted as guidance that Merrill (1999) informs: explain, predict, and trouble-shoot. Explain means respond, by explaining, to any information request from the learners. You can ask other learners to predict any information asked by a learner. You may intentionally malfunction any part of the lesson, and want students to correct it.

**Elicit Performance**

This phase can be explained by the term practice. There are several ways that students can practice the knowledge they learned. Practice is a valuable tool for teachers since it can help discover any problems in your instructions. When you see your students dealing with the practice, you can see the malfunctioning parts. By feedback, which is the following phase, you can correct them.

We explained the “hands off” demonstration which we think is a type of presentation in phase 4. In “Simon Says” simulation you tell the students what to do. For “do the next step” simulation, you tell students to do the next step. You do not describe step; students find it themselves. For “you do it” simulation you allow students to perform any of the steps in any order they designate.

Role-play (Morrison et al., 2001) is an excellent method for practicing interpersonal skills & attitudes since students are directly involved in a mutual conversation.

Provide Feedback

Feedback is one of the most important parts of instruction. Feedback has always been counted as a component of instruction. Even feedback is one of the essential things that experts are trying to come up with better ways to handle in the distance education. Although we look from the instructor’s perspective, feedback also occurs from the learners’ perspective. Any response coming from the learner should be counted as a
feedback to the instructors. Therefore instructor can adjust the “volume” of the instruction.

Feedback is the end of present, practice, guidance, and feedback loop. That means, in the instruction there should always be a cycling process among these components. How does this loop happen? Well, it depends on the learning environment and the flow of the instruction. For example, when a learner asks a question, this may require instructor to repeat a part of presentation which leads a loop to the “Present the Content”. Or, some other information may remind the learner the part where they stuck. Therefore, the feedback would lead to the “Guidance” phase, and so forth.

- Provide constructive feedback. The items should be repeated if the concept is a difficult one.

- Use praising words if students were able to do the practices they were given. Use informative, constructive feedbacks if the student were not able to succeed in the practice.

⚠️ If you were working on a procedural task give corrective, immediate feedback to support the construction of the product. Say, yes, this is the correct way. No, for example, you should not connect this cable there. Otherwise, the learners may automate the wrong steps or actions in their learning processes.
For the interpersonal skills & attitudes assure that students gain confidence and satisfaction from their work. Review the information that has been taught. Make sure that it is done. Kamradt & Kamradt (1999) contend that “attitudes has been decisively adopted if the learner can: (1) Perform the action without clumsiness or hesitation, (2) explain the rationale without confusion, and (3) acknowledge feelings which attest to a satisfied need state. (p.588-589)”

Assess Performance

You should provide test items through which you can assess the performance of the learners. These test items should include the types of questions that were prepared in the same way you present the content and the practice items. In other words, you should not assess learners with something that you did not teach.

For procedure learning performance check lists are very useful tools to assess the performance of the learners on the task. You may also want to assess the product that the students were engaged in. In this case, prepare a scale on which you can grade the students’ knowledge and the quality and functioning of their products.

There are several test methods that can be applied here, we will not mention them all for the sake of space.
Enhance Retention and Transfer

In this phase you should present a context that prepares students to real life applications of the knowledge that they just experienced. They should be able to transfer their experiences to the

- This part can be done in a question answer dialog in which students ask the questions. By this way, you can answer final curiosities in their mind although the instruction has ended.

- For enhancing retention you may show additional example items as many as possible.

- You may additional practice items.

- For procedure learning, if the students have produced a product, show a complete product and the places at which that product can be used.

- Usually, interpersonal skills & attitudes are presented in more specific contexts therefore their examples are more realistic than other types of knowledge.

Outcomes

It is also important to perceive different kinds of outcomes that will be achieved by the completion of instruction. However, here the outcomes should consider the instructional
outcomes, not from the perspective of the learners. Learners’ outcome can be a part of instructional outcomes, not theoretical.

### Conclusion

In this short study, how to teach each type of knowledge under a common roof were brought together. Instructions have general characteristics and Gagné touches this perfectly. The wheel was not reinvented; instruction was interpreted from a different perspective which is the paper work above. The further studies on this paper should ask about how the types of learning according to the types of knowledge can be described. And also, the further studies should focus on the presentation of methods on the flow chart. In anyway creating a study will require a time to spend on it.
Appendix: Example Settings

This background color in the table presents the example that goes with the theory I present. I would like my methods to take place at an electronics class in a technical high school, which is given to the 7th graders. The topic is “how F/F circuits work”. Since the content needs a laboratory, the class is located in an electronics laboratory.

Students would be divided into groups composed of 4 people and sat around the electronic workbenches. All workbenches would have sets of practical equipment (condensers, resistors, transistors, LED diods, wires and an electronic board), whose parts do not need to be soldered together, to run the F/F circuits.

Here is the example:

Here, a completed F/F circuit can be shown and ran flipping the LEDs from on to off.

The students can be told that they can make some Christmas lights by using plenty of LEDs on this circuit.

Are you wondering what will happen if I dropped off one of the LEDs in this circuit – while it is running?

Where are these circuits used?

How they work?
This is not necessary for this class to know how to solder an electronic item onto the electronic board however it is good to ask and remind it, since it is essential information for the electronics students.

Ask if the students are remembering the working principles of the electronic items that will be used to run the F/F circuit.

- Capacitor
- LED diod
- Transistor
- Resistor
- Connection cables

Explain the working principle of F/F circuit by showing the current flows through the electronic items.

Select one volunteer from each group to show his/her group

Use overhead projector or the blackboard to show the principles of the circuit. Therefore the students will have a visual idea, which is the most
likely way to learn.

5. Use the actual materials to show how to connect the electronic items in front of class, if possible at every workbench.

Have the group leaders construct the circuit.

6. After checking groups’ circuits it will be easy to check individual circuits since the incorrect applications will be reduced.

7. By dividing the students into groups you will reduce the number of circuits at once. Therefore checking them will be easy.

In an application, immediate feedbacks have a vital importance since they prevent learning the wrong motor skills.

8. Assess each student’s knowledge according to the scale you prepared.

Assess their products’ quality and functions.
Give them feedback by both grade and explanations.

You can show actual Christmas lights that were done by using F/F circuits. Therefore they will see how their products are countered as a commercial device.

Notes: This is a chapter in Reigeluth's Green Book.

Notes: This is a chapter in Reigeluth's Green Book II.


Notes: Unpublished manuscript, Indiana University - Bloomington, Department of Instructional Systems Technology. From Readings Package.

Notes: Unpublished manuscript, Indiana University - Bloomington, Department of Instructional Systems Technology. From Readings Package.

7. Reigeluth, C. M. Module 2 Teaching Invariant Tasks.
Notes: This is a printed material. I am not sure about its origin.


Notes: This is a chapter in Reigeluth's Green Book II.