Developing Effective Instruction Using Gagne’s Nine Events of Instruction

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INTRODUCTION

WELCOME
Welcome to Developing Effective Instruction Using Gagne’s Nine Events of Instruction.

This handbook is designed to help you increase your knowledge and skill in developing sound instruction incorporating the principles of instructional alignment and information processing theories of memory and learning.

In this handbook, you will be introduced to: the information processing theory of memory and learning; the principles of instructional alignment; and the elements of Gagné’s Nine Events of Instruction. The information in this handbook is based on research conducted by cognitive and instructional psychologists.

LEARNING OBJECTIVES FOR THE WORKSHOP
After completing this workshop, you will be able to:

• Describe the information processing model
• Describe the importance of instructional alignment
• Develop a lesson using Gagné’s Nine Events of Instruction

Let’s get started!
Information Processing

There are many theories regarding the human memory system and how learning occurs, but the most common is the information processing view. The information processing view compares memory to a computer – information enters the brain where the content is manipulated, stored, and then retrieved when necessary.

As human beings, we are sensory registers. Stimuli from the environment are constantly bombarding our senses – sight, hearing, taste, touch, and smell. The information that is being received by our sensory receptors is actually stored in our sensory memory or sensory register – but only briefly. The capacity of sensory memory is quite large, but most sensory information is limited in duration, lasting about one to three seconds. Therefore, for a few seconds, a wealth of data from sensory experiences remains intact. During this brief timeframe, we have a chance to select and organize information for further processing. This is where perception and attention come into play.

We interpret and attach meaning to the information received through our senses using perception – perception is based on our previous knowledge and experiences. This, of course, varies between individuals. That is why two people can participate in class or a lab together, and actually walk out with two very different views of what was discussed.

As stated previously, we are constantly being bombarded with stimuli hitting our sensory registers, and it is, therefore, impossible for us to perceive every sound, temperature change, movement, and smell that we are actually sensing. By paying attention to certain stimuli and ignoring others, we are able to select what information we are going to process.

Our ability to attend to something is very limited. Think about it, you can only pay attention for a few minutes before you have another thought pop into your mind – perhaps you are thinking about getting a coffee after class, or that laundry that you need to do when you get home. Once this thought leaves your mind, you return to paying attention to the task at hand. It happens to all of us! We can pay attention to only one demanding task at a time. Think back to when you were learning to drive. You probably had both hands on the wheel and quite possibly didn't have the radio on because it was too distracting. But now that you
have been driving for several years, you can drive, have the radio on, and talk on the phone. Many processes that initially require attention and focus become automatic with practice.

So, the first step in learning is to pay attention. Because you are oftentimes inundated with information, you have to be selective and focus on what is important, ignoring everything else. If the information is processed in a certain way, that is, if we have paid attention to it, then it moves along into working memory where it can be processed further. Information in working memory is only held temporarily. If it is not combined fairly quickly with knowledge stored in long-term memory, it may be lost from the system.

The duration and capacity of working memory is very limited. There has been much research and discussion among cognitive psychologists regarding the duration and capacity of working memory. The results indicate that new information can be stored in working memory for about five to 20 seconds – that is why working memory is also known as short-term memory. Additionally, the capacity of working memory is only about five to nine separate new items at once (or 7 + or - 2). For example, it is fairly easy to remember one new phone number, but pretty difficult to remember two!

Since the information stored in working memory is very limited in nature and can only be stored for a very short time, it must be kept activated to be retained. To keep this information activated, you need to keep rehearsing it, saying it over and over to yourself – this is called maintenance rehearsal. Once you stop the rehearsal, the information disappears quickly. If information is perceived to be important or necessary, it is critical that we move it into long-term memory.

Another deficiency of working memory is that it is difficult for us to manipulate the data that resides there. That is, it is not easy for us to use that data in any other form than the original form in which it was stored. When we store information in our working memory, we are using rote-memorization techniques, meaning we are remembering the data as it is, or verbatim. As stated in the above example, we know that it is difficult to remember one phone number for more than a few seconds - it is even more difficult to be able to remember that number and restate it backwards!
There are quite a few differences between working-memory and long-term memory. Long-term memory has three characteristics that are especially worth noting: a long duration, an essentially unlimited capacity, and a rich network of interconnections. See Table 1.

Table 1
Characteristics of Memory

<table>
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<th>Sensory Register</th>
<th>Working Memory</th>
<th>Long-term Memory</th>
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</thead>
<tbody>
<tr>
<td><strong>Capacity</strong></td>
<td>Large</td>
<td>Small</td>
<td>Unlimited</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>Very short; 1-3 seconds</td>
<td>5-20 seconds</td>
<td>Long time; permanent</td>
</tr>
</tbody>
</table>

As discussed previously, information can enter working-memory fairly quickly. Moving information into long-term memory actually takes more time and effort. In contrast to working-memory, the capacity of long-term memory appears to be unlimited. Additionally, once information is stored in long-term memory, it can remain there relatively permanently. In theory, you should be able to remember as much as you want for as long as you want.

Though long-term memory is said to be permanent, there are times when we forget. Forgetting is typically explained by two theories – **decay** and **interference**. Decay occurs when we haven't used the information in a while. We can think of it as information being filed in a filing cabinet in the back of our brain that has gotten covered with dust and cobwebs because it hasn't been retrieved for some time. The information still resides there, we just need to activate it and dust it off! Interference occurs when we get information confused. New learnings may interfere with old learnings, or old learnings may interfere with new learnings. Oftentimes this occurs when we haven't learned the information well initially. See Figure 1.
Both issues of decay and interference can be overcome quite easily. You can reactivate the information you haven't used in a while, and you can also re-learn or deepen your understanding of concepts that were previously confusing.

It is pretty apparent, therefore, that long-term memory provides you with a very secure storage area. You have a lot of information stored there, but the problem may be finding the right information when it is needed. Your access to information in working memory is immediate because you are thinking about the information at that very moment, whereas access to information in long-term memory may sometimes be a bit more difficult. The ease with which information is retrieved from long-term memory depends to some extent on whether the information is connected with related pieces of information. Cognitive scientists have discovered that the information stored in long-term memory is organized and interconnected. In order to effectively store information in long-term memory and assist in developing a deeper understanding, you need to integrate the new information with prior knowledge, or information already in your long-term memory.

To be useful, knowledge must be remembered. Our goal as instructors should be to assist our students in getting information into their long-term memories as quickly as possible.
**INSTRUCTIONAL ALIGNMENT**

Oftentimes, as instructors, we may contemplate some, if not all, of the following questions -

- What content do I need to cover during the next class period, during the next week, during this quarter, or this semester?
- How am I going to design and develop my instruction?
- What types of instructional strategies will I use?
- What types of learning activities will my students need to complete?
- How will I know that my students are progressing?
- How will I determine what they have learned?
- How effectively did I teach the material?
- Have they learned it as well as they should? In other words, did they achieve the learning objectives?

Each one of these questions cannot be answered in isolation but needs to be considered in conjunction with each of the other questions. A comprehensive solution can be formulated, however, through the application of **instructional alignment** principles.

Instructional alignment refers to the connection between learning objectives, instruction, and assessment. In other words, it means ensuring that what we teach, how we teach, and how we assess are in agreement. When we develop instruction that is aligned, we are providing students with a better opportunity to learn and achieve the desired learning goals. See Figure 2.
Cognitive psychologists and instructional theorists extensively researched the elements necessary to develop an effective unit of instruction. Their results indicated that to facilitate learning, each lesson should include:

- Introduction
- Body
- Conclusion
- Assessment
Gagné’s Nine Events of Instruction

Robert Gagné is considered to be the foremost researcher and developer of instructional design principles. In his work, Gagné studied the ‘mental events’ as described in the information processing model, and considered the elements determined by instructional theorists to be the necessary components of a lesson. In 1965, he published *The Conditions of Learning* in which he described the organizational structure of instruction necessary to promote and enhance student learning relative to these ‘mental events’ and instructional elements. His organizational structure is known as the Nine Events of Instruction. Even though he introduced his model over 40 years ago, it has stood the test of time as demonstrated by its use in the development of e-learning environments.

Often, classroom instructors and instructional designers divide the nine events into three categories: pre-instruction; instruction; and, post-instruction. By considering a unit as a series of phases, it may be easier to sequence and align the instructional materials. See Table 2.

In the pre-instructional phase, instructors are preparing the student for learning. They attempt to gain student interest and motivate them, informing them of why the material is important and relevant. In this phase instructors also inform students of what they are going to be expected to do after the instruction – what behavioral change they should be able to demonstrate based on the knowledge, skills, and attitudes presented during the instructional phase. In order to prepare the student for learning, it is important for instructors to activate the students’ prior content knowledge that may be similar or related.

During the instruction phase, instructors provide the student with the content material. It is also important that they share with the students how to ‘think’ about this new information. Students should be given the opportunity to use or apply this new knowledge and be provided with immediate, corrective feedback.

The post-instruction phase focuses on wrapping-up the lesson by reviewing the material and examples provided. It is also important, at this time, for instructors to present examples of how the new information relates to other content areas, and situations in which this information applies in order to enhance retention and transfer.
Table 2  
*Gagné’s Nine Events of Instruction*

<table>
<thead>
<tr>
<th>Instructional Event</th>
<th>Mental Processes</th>
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<tbody>
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<td><strong>Pre-Instruction</strong></td>
<td></td>
</tr>
<tr>
<td>Gaining attention</td>
<td>Stimulate the learners interest, attention, and motivation</td>
</tr>
<tr>
<td>Informing the learner of the objective</td>
<td>Make learners aware of what to expect so that they are prepared to receive information</td>
</tr>
<tr>
<td>Stimulating recall of prior learning</td>
<td>Assist learners in remembering what they may already know about the concept</td>
</tr>
<tr>
<td><strong>Instruction</strong></td>
<td></td>
</tr>
<tr>
<td>Presenting the content</td>
<td>Provide the learner with the material, stressing key elements</td>
</tr>
<tr>
<td>Providing guidance for the learner</td>
<td>Provide the learner with examples, and explanations</td>
</tr>
<tr>
<td>Eliciting performance (practice)</td>
<td>Allow learners to use, and apply the new information</td>
</tr>
<tr>
<td>Provide immediate feedback</td>
<td>Instructor feedback should be immediate, specific, corrective, and have a positive tone</td>
</tr>
<tr>
<td><strong>Post-Instruction</strong></td>
<td></td>
</tr>
<tr>
<td>Assessing performance</td>
<td>Determine the learner’s acquisition of knowledge; measure their achievement</td>
</tr>
<tr>
<td>Enhance retention and transfer</td>
<td>Provide the learner with an opportunity to apply the new information to a novel situation</td>
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Gaining Attention

Instructional Event 1
Gaining Attention

As described previously, the first step in learning is to pay attention. Because students are oftentimes bombarded with information, they have to be selective and focus on what is important, ignoring everything else. When students are new to a content area, or may not have the expertise to discern why material may be important or relevant, it is important that instructors provide that assistance.

Stimulating student’s attention can be done in a variety of ways:

- Demonstrations
- Case studies
- Presenting a problem to be solved
- Displaying images, graphics, videos
- Simply telling students why the material is important

By paying attention, students are better able to select the information they need to process thereby allowing it to move into working memory where it can be processed even further. As you know, information in working memory is only held temporarily, and if it is not combined fairly quickly with knowledge stored in long-term memory, it may be lost from the system. Providing students with opportunities to use this information is, therefore, critical, and is done during instructional event six, Eliciting Performance.
**Instructional Event 2**

**Informing The Learner of the Objectives**

Informing students of the learning objectives assists them in benefiting from instruction by allowing them to become aware of what the instruction will entail, and an expectancy of what they will be required to do at the end of the unit. Informing them of the objectives will also allow them to begin to organize their thoughts and prepare themselves to receive the new information.

Providing students with the learning objectives can also help activate any prior knowledge they may have regarding the topic, which will allow for greater, more successful transfer of knowledge to long-term memory. Additionally, students will know what they are responsible for learning, or in other words, what they can expect to see on the assessment. Students can also determine the learning strategies necessary for accomplishing an educational task from the verb used in the learning objective.

There is an old saying in Instructional Design that states:

- Tell them what you’re going to teach them
- Teach them
- Tell them what you taught them
Instructional Event 3

Stimulating Recall of Prior Knowledge

One of the most important aspects of learning is what students bring to the learning situation. Their knowledge and experience gained in one learning situation can serve as the foundation for learning in subsequent situations. Prior knowledge and beliefs play a major role in the meanings that students construct. All of their experiences from work, academics, interactions with family and friends, along with the things they read and hear, contribute to the development of new knowledge.

Students that are new to a content area may not have the knowledge or expertise to determine what prior knowledge may be relevant to the new information they are about to receive. By reminding students of content information covered in pre-requisite classes or labs, instructors are providing them with connections between new information and their foundation of knowledge. In describing these relationships, instructors are presenting students with an organizational structure or framework, which can help them in learning and remembering.
**Instructional Event 4**

**Presenting the Content Materials**

The instructional strategy that instructors use to present the content material greatly depends on the learning objectives. If the goal of instruction is for students to acquire verbal information, then a lecture, chapter review, or even a video displaying the relevant content may be appropriate. If the goal of instruction is that students should be able to conduct a specific procedure, then the most effective method may be demonstrating the most distinctive features of the procedure. Regardless of the type of learning outcome, the instructional strategy should emphasize the essential elements of that outcome.

When presenting new material, it is important to consider chunking information into meaningful subsets. Chunking information in this way may prevent students from feeling as though they are receiving information ‘by way of the firehouse’, and assists them in learning the key components of the material in a sequential manner. Additionally, chunking information allows students to receive feedback on learning activities focused on the various aspects of a concept, which may help uncover specific areas of misunderstanding, instead of not knowing the underlying cause of a learning challenge. In order to sequence instruction into meaningful subsets, it may be helpful to use Bloom’s Revised Taxonomy in order to align instruction with the learning objectives.

<table>
<thead>
<tr>
<th>Knowledge Dimension</th>
<th>Cognitive</th>
<th>Process</th>
<th>Dimension</th>
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<tr>
<td></td>
<td>Remember</td>
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<tr>
<td>Factual</td>
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<td></td>
<td>Understand</td>
<td>Apply</td>
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<td></td>
<td>Obj 1</td>
<td>Inst 1</td>
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<td>Obj 2</td>
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<tr>
<td>Conceptual</td>
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<td>Procedural</td>
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<tr>
<td>Metacognitive</td>
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Providing the Learner with Guidance

Instructional Event 5
Providing the Learner With Guidance

In this instructional event, instructors should assist learners in moving the new information into their long-term memories. There are two fundamental principles from cognitive psychology that are important for instructors to know -

1. Students learn new information more easily when they can relate it to something they already know, and
2. Students learn several pieces of new information more easily when they can relate them to an overall organizational structure

We have already discussed the importance of stimulating prior knowledge to enhance learning and in providing our students with a framework or organizational structure to attach new information. Both of these strategies will greatly enable students to learn more effectively.

Recognizing a relationship between new information and something already stored in long-term memory is known as the process of meaningful learning. Research has found that these connections make it easier to understand new information and transfer it to more permanent memory. If students have several connections to something in their memory, then they will have several paths they can use to find that information in the future - making remembering much easier. If a student only has one path to reach something, then it may be less likely, and more challenging, for him or her to locate it successfully in the future.

In addition to assisting students in making connections within an organized framework, it may also be beneficial for instructors to help them become aware of how to think, learn, and reason within the particular discipline. When encountering novel learning situations, students may not know how to think within the discipline, therefore, providing students with this guidance can greatly enhance their learning.
**Instructional Event 6**

**Eliciting Performance**

Providing students with opportunities to demonstrate what they have learned is critical. The purpose of this instructional event is not to evaluate students for a grade, but to allow them to become active participants in their own learning. Their interaction with the content materials will reveal their levels of learning and comprehension, as well as areas where remediation may be necessary.

Practice activities should align with the learning objectives. As with instruction, practice may be sequenced from the more simple to complex concepts. Depending on the type of learner, novice or advanced, practice on the complete range of objectives may or may not be necessary. For novice learners, it may be important to provide learning opportunities on all of the objectives, but for advanced learners, it may be safe to assume that they will experience spontaneous learning over time.

Activities for practice may include:

- Case studies
- Problem solving
- Discussions
- Simulations
- Role-playing
Feedback is critical to learning, and it is sometimes not provided in an adequate or appropriate manner. Oftentimes, instructors may inform their students that they have done a “Great job”, or “Good work”. While this type of reinforcement may increase student motivation and self-efficacy, it does not provide him or her with useful information on their performance.

Feedback should provide the student with information on their current level of knowledge or skill relative to the desired learning outcome. Students often need help determining why their performance or responses are incorrect, and without corrective feedback they are likely to make the same mistakes again.

Informative, or effective feedback, has four essential characteristics:

1. It is immediate
2. It is specific
3. It provides corrective information
4. It has a positive emotional tone

The purpose of this type of feedback is to give the student an opportunity to reconsider the accuracy of their responses. If possible, it is beneficial to combine corrective feedback with a second opportunity for practice. When feedback indicates to the student that he or she has reached or even exceeded the learning goal, the student should feel satisfied and competent – possibly inspiring him or her to set a higher goal for the future!
**Instructional Event 8**

**Assessing Performance**

During this instructional event, instructors typically use formal evaluation techniques to determine their student’s level of achievement of the learning objectives. Formal assessment usually consists of graded written unit, mid-term or final tests, projects, skill demonstrations, and other similar activities. No single assessment method can reveal all aspects of learning comprehensively, so several approaches may be necessary.

Sometimes instructors may decide not to include graded assessments in each lesson, but instead delay it until after several lessons. If this is the case, other types of assessment can be implemented to evaluate student learning. Some optional methods include: instructor questions posed during class discussions; observations of student performance in class or labs; student written responses to questions, or solving application-type problems.

Regardless of the methodology used, the data or evidence collected will result in some type of decision or evaluation. In general, assessment should help you answer the following questions:

- How well did students learn the material?
- How well did I teach the material?
- What should I do differently next time?

In order to make well-informed decisions, it is critical that the information collected is accurate, aligned with the learning objectives, and of high quality so that subsequent decisions are not flawed.
**Instructional Event 9**
**Enhancing Retention And Transfer**

Although this instructional event is listed as the last in the series, it is usually not included only at this stage. Informing students of examples or other contexts in which to apply the content information can be done during instructional event 5, Providing Learning Guidance. As learning progresses, other examples of transfer and application can be used during instructional event 6, Elicit Performance.

Retention and transfer can be enhanced through application to ‘real-life’ or current event types of scenarios. Transfer activities may also involve asking students to find examples or apply principles in real-life conditions that they would anticipate encountering in their professional practices. Students may even be encouraged to apply the new information to familiar contexts in order to personalize the information.
Practice

In the space below, develop a unit of instruction using Gagne’s Nine Events of Instruction.

Focus of the instructional unit:

Gain Attention

Inform the Learners of the Objectives

Stimulate Recall of Prior Learning

Present the Content Materials

Provide Learning Guidance
Elicit Performance

Provide Feedback

Assess Performance

Enhance Retention and Transfer
Congratulations!
You have successfully completed the unit on Developing Effective Instruction Using Gagne’s Nine Events of Instruction. By using the information from this workshop, you will be able to develop well-structured, well-aligned instruction. Designing and developing instruction based on these nine elements will greatly facilitate your students learning.
REFERENCES

