

GAGNÉ'S 9 EVENTS OF INSTRUCTION - A TIME TESTED WAY TO IMPROVE TEACHING

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ABSTRACT

Objective: To demonstrate the effect of using Gagné's 9 events of instruction in teaching.

Study Design: Quasi experimental study.

Place and Duration of Study: Armed Forces Institute of Radiology and Imaging, Rawalpindi, Pakistan and Armed Forces Postgraduate Medical Institute, Rawalpindi, Pakistan from May 2014 to Sep 2014.

Material and Methods: This two phased study consisted of 4 lectures in each phase. In Phase I conventional lectures were delivered without taking Gagné's 9 events of instruction into account while in Phase II lectures were based on these events. Learners' Approval Rate (LAR) was used as performance assessment tool for every lecture. LAR for every lecture was calculated, making use of a score assigned by the learners in a feedback proforma. Average LAR for each phase was also calculated. Data was presented in tabulated and graphical form and analyzed by 2-sample t-test with Minitab version 16.

Results: Lecture LAR in phase I of the study ranged from 57% to 66% with phase LAR of 60.7%. In phase II however a significant ($p < 0.05$) rise in lecture LAR was seen ranging from 78% to 88% with phase LAR of 82.5% suggesting greater learners' approval and satisfaction after using Gagné's 9 events of instruction. A steady increase in LAR was also noted in phase II.

Conclusion: Gagné's 9 events of instruction provide an important framework for teaching sessions which improves performance as a teacher and also ensures improved Learners' Approval Rate because of better understating and retention of knowledge.

Keywords: Gagné, Instruction, Learning events, Teaching.

INTRODUCTION

Learning has been the reason of human progress. With the passage of time, human being also learned to facilitate the learning process itself in the form of organized teaching. Since then, there has been continuous progress in the ways and means of imparting knowledge from one human being to others. Before the presently preferred and advocated student centered constructivist approach, the emphasis was on a teacher centered behaviourist mode of teaching¹. It resembled a one way traffic with flow of knowledge from the teacher to the learners². The behaviourist approach was based on the assumption that behaviour could be predicted and controlled if we could control the environment in which people were placed³.

Robert Gagné is known for his "Conditions of Learning" which describes five levels of learning namely verbal information, intellectual skills, cognitive strategies, motor skills and attitudes⁴. Different internal and external conditions are necessary for each type of learning^{5,6}. His theory of instruction consists of a taxonomy of learning outcomes, conditions of learning and nine events of instruction⁷. Table-1 shows Gagné's 9 events of instruction which are sequenced in this manner because each of them affects the internal processing of information in the same order. The input from our senses moves information into the sensory registers and then into short-term memory. From there it is encoded, stored in long-term memory, and finally retrieved when required. The learning model takes into account these steps of memory and also includes specific actions for every event⁸.

Our undergraduate and postgraduate teaching contains a significant portion of conventional lectures. Based on these nine events, these lectures can become more interactive, leading to better learning and

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enhanced retention. This study was conducted to see the effectiveness of Gagné's 9 events of instruction in improving our teaching sessions.

MATERIAL AND METHODS

This study was carried out in Armed Forces Institute of Radiology and Imaging

delivered making use of these events of instruction as shown in Table-1.

Gaining attention was achieved by starting with a quiz, question, quote or statistic pertinent to the topic of the lecture. Objectives of the lecture were announced by listing /

Table-1: 'Gagné's 9 events of instruction', suggested actions and the mental processes involved Adapted from Gagné RM and Medsker KL. (1996).

Event	Action	Mental process
1. Gaining attention	Use questions, pictures or relevant scenarios	Reception
2. Informing learners of the objective	Tell learners what they will be able to do after learning	Expectancy
3. Stimulating recall of prior knowledge	Ask for recall of prior relevant knowledge	Retrieval to working memory
4. Presenting the content	Structured display of the contents to be learned	Selective perception
5. Providing "Learning guidance"	Use mnemonics, elaboration, pictures, graphs	Semantic encoding
6. Eliciting performance	Ask learners to perform	Responding
7. Providing feedback	Give corrective feedback	Reinforcement
8. Assessing performance	Additional learner performance with feedback	Retrieval & reinforcement
9. Enhancing retention & Transfer	Ask learners to apply knowledge in real life scenarios	Retrieval & generalization

Table-2: Learners' Approval Rate. Lecture LAR was calculated from Average score (SAverage) for that lecture. Phase LAR was obtained by averaging Lecture LARs in that phase.

Lecture (Lec)	Learner (L)															S Average	Lecture LAR	Phase LAR
	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15			
Phase I																		
Lec-1	17	15	14	15	15	16	18	15	16	14	17	16	-	-	-	15.7	58%	60.7%
Lec-2	19	17	18	17	18	18	16	17	20	19	18	17	17	18	17	17.8	66%	
Lec-3	17	16	16	17	15	17	16	20	17	18	17	15	16	-	-	16.7	62%	
Lec-4	16	18	15	16	19	12	11	18	16	14	-	-	-	-	-	15.5	57%	
Phase II																		
Lec-1	22	22	21	20	22	18	21	21	23	22	-	-	-	-	-	21.2	78%	82.5%
Lec-2	22	20	25	21	21	25	20	24	20	22	20	21	20	23	24	21.8	81%	
Lec-3	24	23	26	26	25	24	26	26	23	25	25	-	-	-	-	22.4	83%	
Lec-4	23	22	24	23	25	26	22	25	25	24	25	-	-	-	-	24	88%	

Rawalpindi and Armed Forces Postgraduate Medical Institute Rawalpindi in two phases consisting of four lectures each. Each phase consisted of four lectures delivered either to the postgraduate residents or radiographers. During the first phase lectures were delivered in a conventional way without taking Gagné's 9 events of instruction into account. In the second phase lectures were planned, organized and

negotiating expectations of the day's lesson. The topic of the day was related to relevant knowledge the learners already had which provided a framework for knowledge transfer. The actual new content to be learnt was presented in structured form followed by providing learning guidance by using metaphors, chunking, mnemonics, rehearsal thus helping learners to organize the new content. Learners' performance was elicited by

giving them an opportunity to practice followed by positive corrective feedback. Learning progress was assessed by appropriate questions and finally enhance retention and transfer was achieved by putting the new content learnt in real life situation⁹.

Learners' Approval Rate

In each phase, after every lecture, a feedback proforma was circulated among the learners. They were asked to assign a score ranging from 0-3 to each learning event depending upon their approval and satisfaction. Thus every learner had a total score (STotal) of 27 for the lecture. An Average score (SAverage) was calculated for each lecture considering the feedback of all learners. The average score was converted into Learners' Approval Rate (LAR) for that lecture by using formula $(SAverage/STotal) \times 100$ which was used as a performance assessment tool in the study. Phase LAR was calculated by averaging lecture LARs in that phase. Data was represented in tabulated and graphical forms for comparing LAR of the two phases.

Data Analysis

The Data for LAR in two phases was analysed by 2-sample t-test with Minitab Version 16 (Minitab Inc, State College, PA, USA) at a significance level of 0.05.

RESULTS

The number of students in four lectures of phase I was 12, 15, 13 and 10 respectively while in phase II it was 10, 15, 11 and 11 respectively (Table-2).

Lecture LAR during phase I ranged from 57% to 66% while in phase II it ranged from 78% to 88% (Table-2). Phase LAR for phase I was 60.7% while for phase II it was 82.5% indicating a greater learners' approval and satisfaction after Gagné's 9 events of instruction were taken into account.

A significant ($p < 0.05$) increase in LAR was observed in phase II (Fig-1). A steady increase in LAR was also found in phase II indicating an improved teacher's performance with increasing experience resulting in better application of the events of instruction.

Better LAR in phase II was found to be associated to the use of Gagné's 9 events of instruction in the lectures.

DISCUSSION

Learning and memory are closely associated with each other and cannot be

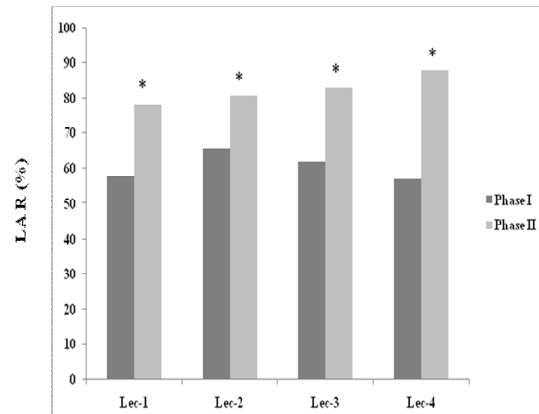


Figure-1. Percent Learners' Approval Rate calculated from Average scores ($S_{Average}$) of the two phases. A significant ($p < 0.05$) increase in values of LAR in two phases is shown by * obtained by using 2-sample t-test.

considered in isolation. Teaching can be more effective if the learning events take into account and facilitate memory¹⁰. Memory has been divided into sensory memory, short term or working memory and long term memory and depends upon encoding, storage and retrieval¹¹. Better encoding results in better retrieval or better memory. It depends upon attention, expecting what is to be learnt and association with prior knowledge. It also results from structuring the content to be learnt, reinforcing it with eliciting learners' performance and a positive, corrective feedback. Assessing performance and retrieval/generalization also help in better encoding. Gagné's 9 events of instruction take care of all these processes and thus ensure better learning and enhanced retention of knowledge.

In our study the teacher had exposure to Gagné's 9 events of instruction as part of a contact session in medical education program which led to their practical application in actual teaching sessions. A comparison with lectures delivered without taking into account these events showed that there was a positive

learners' response after taking care of these events.

Gaining attention of the learners is an oft ignored part of our teaching sessions. Without attention the information we receive is easily lost and does not make its way even to the short term memory. Attention of the learners can be ensured by showing a relevant picture, presenting a scenario or asking a question¹².

Informing learners about the content to be learnt allows them to recall their prior knowledge. Memory, as we know is a constructive process which makes use of the previous knowledge while building new knowledge. A deliberate effort should be made to stimulate learners to recall the relevant prior knowledge¹³.

Presenting the new content bit by bit with repeated summaries and chunking helps in retention. Learning guidance can be provided in the form of mnemonics, repeated rehearsals, graphical presentation and scenario elaboration. All these help in encoding the content to be learned to the long term memory¹⁴.

Eliciting performance aims at correct understanding and comprehension. It is not used for scoring and is followed by corrective feedback to ensure better learning. Performance can be assessed later by relevant questions or scenarios, giving a feeling of satisfaction to learners when successfully completed. Finally putting the content learnt in real life situations attempts at enhanced retention and transfer of knowledge for prolonged storage in long term memory and retrieval when required.

Our study emphasizes the importance of considering the internal mental processes leading to better understanding and comprehension during our teaching sessions. It also shows that there is a steady improvement in teacher's performance with growing experience as indicated by a steady rise in LAR in phase II.

Our results are in accordance with TK Neo et al, 2010 who assessed the effects of using 'Gagné's events of instructions' in a multimedia student-centered environment and their results were positive and encouraging. They showed

the positive role of these events even in a more constructivist situation¹⁵.

A limitation of our study is considering a small number of lectures. We suggest that all lectures should be followed by getting feedback from the learners for improving the performance on the basis of these events of learning. This feedback can later be used as a foundation for larger studies.

Though coming from a behaviourist background, Gagné's 9 events of instruction is one of the most popular instructional models that can be adapted to assimilate the notions of constructivism¹⁶. While advocating a shift from behavioural to constructivist approach, we all know our limitations and we feel that Gagné's 9 events of instruction provide a middle ground between these two schools of thought despite its obvious tilt towards behaviourist principles. Our study demonstrated the positive effect of Gagné's 9 events of instruction in our teaching sessions.

Our study demonstrated that we could improve our traditional teaching by making our lectures more interactive by taking Gagné's 9 events into account. This was in accordance with Wessels A et al. who showed the importance of interactive lectures in effective teaching and learning¹⁷. Using modern audio-visual technology along with Gagné's 9 events of instruction makes teaching even more interesting and useful¹⁸.

CONCLUSION

Gagné's 9 events of instruction provide a very important framework for our teaching sessions. Their consideration not only significantly improves our performance as a teacher but also increases Learners' Approval Rate suggesting better understating and retention of knowledge.

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CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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