ORIGINAL ARTICLE

EFFECT OF GAGNE'S EVENTS OF INSTRUCTION ON ACADEMIC PERFORMANCE OF POSTGRADUATE FCPS RESIDENTS IN OBSTETRICS AND GYNAECOLOGY

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Background: Learning and teaching has been transformed from traditional teacher centered behaviorist approach to more preferred student-centered constructivist approach. Applying Gagne's nine-step model is a very effective way to enhance systematic learning of students. This research assesses the integration of Gagne's instructional model for teaching sessions of postgraduate residents in obstetrics and Gynaecology. **Methods:** This quasi-experimental study was performed on FCPS postgraduate residents (PGRs) of the department of Obstetrics and Gynaecology, Ayub Teaching Hospital, Abbottabad. Twenty PGRs were assigned into two groups and teaching sessions were conducted using traditional and Gagne's instructional model. Knowledge tests were used before and after both teaching sessions in order to assess academic achievement. In the analysis of academic scores, mean score differences were analyzed by using paired t-test. **Results:** An enhanced performance was evident in the post-test results of the group of postgraduate residents taught by incorporation of Gagne's instructional model in teaching sessions compared to the conventional teaching style. The PGRs taught by lessons based on Gagne's nine events of instructions had significantly higher post-test marks of 76.8% and 78.4% compared to pretest marks of 66% and 63.8% in Group-A & B respectively, (t=4.52; p<0.01), boosting their learning effectiveness by up to 10.8 and 14.8%. **Conclusion:** Gagne's nine events of instruction provide a practical and effective framework for enhancing student engagement, retention, and academic performance in medical education. The findings support the adoption of structured, student-centered teaching strategies like Gagne's instruction model to improve educational outcomes in PGRs in low-resource settings.

Keywords: Gagne's Nine Events of Instruction; Academic Performance; Student-Centered Learning

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INTRODUCTION

Gagne's nine events of instruction have been applied to the design of instruction in several domains including medical education.[1,2] Instructional models play a vital role in developing teaching strategies and integration of Gagne's nine-step model in teaching clinical skills is an impactful way to enhance systematic learning of students. It has been fairly productive to structure a lesson and gives a holistic view to the teaching.[3,4]

Gagne's nine events of instruction consist of actions such as gaining attention, informing learners of the objective and stimulating recall of prior knowledge before presenting the content in a lecture. This is followed by providing learning guidance, eliciting performance and providing feedback, assessing performance and finally strategies to enhance retention & transfer of knowledge to long term memory.[5,6] Such teaching strategies can change traditional teaching which emphasize on didactic, teacher-centered and a discipline-based approach to a student-centered, integrated approach. Incorporation of Gagne's events of instructions in to the existing approach to teaching of students and post graduate residents (PGRs), can lead to more interactive lectures, leading to better learning and enhanced retention in long term memory.[1] In Pakistan and other low resource countries, medical teaching of under and postgraduate learners is still carried out by conventional lectures in both public and private sector medical institutions. The traditional didactic lectures still hold the lion share of teaching strategies and styles which tends to create a culture of attending classes and forgetting nearly all that was taught.[3,4]

The focus of majority of the research in medical education are undergraduate medical students while the postgraduate training programs still lack structured formal teaching due to busy hospital settings.

Gagne's nine events of instruction are based on learning along a continuum and it is related to motor, cognitive processing, intellectual skills and learner attitudes.[7–9] An effective training program leads to development of expected knowledge, skills and attitudes of PGRs and improves their performance during training. In a teaching session, without a structured lesson plan, the role of learner is only passive which does not increase their motivation and retention of knowledge.[1] As the

adult learners have varying learning needs, therefore they need unique instructional designs to support their learning requirements. Similarly, PGRs for fellowship training are coming from diverse backgrounds who may not have been exposed to student-centred teaching methodologies during their undergraduate teaching.[8–10]

As there is scarcity of research in medical teaching in Khyber Pakhtunkhwa in general, and public sector medical colleges in particular, this study would likely generate an awareness among teaching faculty about structured lesson plan using Gagne's model. As educational reforms in low-resource countries are still far behind the developed countries, such studies will create an awareness among teaching faculty and training supervisors about student-centered approach to post graduate teaching.[1]

This study was conducted to observe the effectiveness of application of Gagne's nine events of instruction in conventional teaching sessions of PGRs, measured in terms of difference in pre and post test score. The objective of this study is to transform a conventional teaching session from teacher-centered to student-centered by incorporating Gagne's events of instruction to enhance motivation of learners to better achieve learning outcomes.

This study may provide the teaching faculty and CPSP supervisors with a guideline to enhance their quality of teaching using Gagne's nine events. This study may also benefit the PGRs by helping them enhance not only their learning but also their teaching skills and improve their success rate.[7,9] The implications of the findings of this study will be useful in enhancing educational reform in low resource environment through use of Gagne nine events model as a structured lesson plan in postgraduate teaching, leading to better learning outcomes.[10–13]

MATERIAL AND METHODS

This quasi-experimental study was carried out in the Department of Obstetrics and Gynaecology, Unit-A at Ayub Medical Teaching Institution (AMTI) Abbottabad, from 1st February 2024 to 31st July 2024. The study subjects consisted of Postgraduate Residents (PGRs) doing fellowship in Obstetrics and Gynaecology, who have not yet appeared in their intermediate module examinations. PGRs who have passed IMM examination and those who did not complete pre or post-test were excluded from the study. Twenty PGRs were recruited for the study and divided into two Groups: Group-A and Group-B, using a lottery method.

In Phase-1, formal teaching session of Group-A was conducted using traditional lectures, while Group-B was taught the same topic after designing a lesson plan using Gagne's Nine Events of Instruction in their teaching session. Pretest and post-tests were conducted at the start and end of both teaching sessions by using Socrative quiz with timer.

In the second phase groups were crossed over so that the Group-A which was taught by traditional lecture was then taught by incorporating Gagne's 9 events of instruction and Group-B by conventional way to avoid ethical issues by giving both groups opportunity of being taught by both methods.

Their average pre and post-test scores in all teaching sessions were computed and compared. A paired t-test was used to determine the effectiveness of the traditional teaching methods versus teaching by using Gagne's model in the teaching sessions.

RESULTS

The Pre-test and post-test results for each teaching technique were compared using paired t-tests. For Group-A, the average post-test score increased slightly from 65.2%–69.5% with traditional teaching session while it significantly improved from 66.0% –76.8% with the application of Gagne's instructional model ($p<0.01$), suggesting that Gagne's model had a better impact on learning outcomes. Similarly, Group-B followed the same trend where the post-test percentage improved from 64.5% in the traditional teaching method to 79.3% with the application of Gagne's events of instruction. This improvement was also statistically significant, with a *p*-value of <0.01.

There was a significant difference between the level of improvement with the two methods. Incorporation of Gagne's nine events of instructions in teaching sessions led to significantly higher post-test marks of 76.8% and 78.4% as compared to pretest marks of 66% and 63.8% with traditional teaching in groups A & B respectively, ($p<0.01$). Improvement of 10.8% & 14.8% in academic scores of PGRs with Gagne's nine events of instruction as opposed to 3.7% & 4.3% improvement with traditional teaching, in both groups clearly illustrates the efficacy of Gagne's nine events on students learning.

Table-1: Comparison of average pre-test and post-test scores

Groups	Teaching method	Average pre-test score	Average post-test score	*p*-value
Group A	Traditional method	65.2%	69.5%	0.08
	Gagne's nine events of instruction	66.0%	76.8 %	<0.01
Group B	Traditional method	64.5%	68.2%	<0.07
	Group B Gagne's nine events of instruction	63.8%	78.4%	<0.01

Table-2: Improvement percentage in learning outcomes

Group	Traditional Teaching	Gagne's Model	Difference (%)
A	4.3%	10.8%	6.5%
B	3.7%	14.8%	11.0%

DISCUSSION

Use of Gagne's nine Events of Instruction in teaching sessions have the potential to improve students' academic performance. The results of our study correlate well with previously conducted studies.

The components of structured learning events involving learner's attention, feedback, performance and focused attention helps students achieve higher retention and understanding of complex material.[2,7] Ullah *et al*.[1] Also elaborated in their study that Gagne's nine events strengthens teaching effectiveness in clinical teaching. Their study applied Gagne's model on postgraduate residents and concluded that it leads to enhanced understanding and knowledge retention which correlates well with our study.

Gagne's framework effectively addresses the failure of traditional teaching methods in low resource countries. A recent study by Lam & Lam, focusing on five sub regions of Asia, concluded that due to the model of education in Asian countries, there is a need to enhance interaction in teaching and incorporate humanity into current teaching methods.[5] Silberman also stressed in his book that active training is strategic for fostering better educational results. The author emphasized on use of a step wise instructional design for teaching and training to maximize the participants' understanding and retention of the subject matter.[6] Moreover, Miner *et al*[4] reported enhanced student outcomes in undergraduate nursing when Gagne's instructional events' model was applied. Bastable SB also emphasized the need for instructional strategies focusing on learner-centered practices to empower the learners especially in teaching and training of nurses. This shows that Gagne's model can be used across disciplines. As mentioned above, this formulation of the model fits well in many fields.[4,12]

Our study showed significant improvement in post-tests score after incorporating Gagne's nine events in teaching session. Daniel A, *et al*[14] and others[14] also reported significant knowledge gain after making lectures more interactive by taking Gagne's 9 events into account. Another study by Sajid MR highlighted that Gagne's model facilitates learning according to the complexity of the task[15].

A significant problem with lectures as reported by Wessels A *et al*[16] is the need of continuous attention of learners. Our study also showed poor rise in post-test score after traditional teaching sessions without Gagne's events of instruction. According to Bloom, there is lack of continuous attention in lectures which results in learner's low effort to acquire knowledge. It is common for the learners to become absent-minded after a certain amount of time (Bloom, 1953).[16]

As in low resource countries, the lectures still bear some advantages over other teaching methods, like economic aspect, flexibility, feasibility and extensive coverage of certain aspects of knowledge acquisition, so it is wise to make them more interactive and student-centered rather than abandoning them in post graduate teaching.[16] Similarly, as reported by Teoh BS *et al*. the use of modern audio- visual technology in addition to Gagne's 9 events of instruction can makes teaching even more engaging and effective[1,17].

Furthermore, Brown *et al.*[10] provided strong evidence showing better long-term retrieval and understanding by application of appropriate instructional model. However, as demonstrated, Gagne's model has some potential drawbacks. The differences in learners' preferences and the reliance on instructors to follow all the nine steps present challenges. Salas *et al*.[13] found that instructional success depends on how well the teaching strategies are aligned with the individual and group needs. In the same regard, Khadjooi *et al*.[3] showed that applying Gagne's model to psychomotor skill training involves extensive preparation and constant fine-tuning.

In our study, the long-term learning, knowledge retention and clinical performance was not assessed. No doubt Gagne's nine events provide valuable insights into optimizing teaching strategies for students and postgraduate residents in clinical settings as reported by many authors[1,2,4,5,13,14] but Gagne's instructional model lacks long-term impact of the instructional design on knowledge retention and clinical performance. as reported by Daniel A *et al*. in their recent study done in a university in Malaysia[14].

Therefore, future studies should address these difficulties and investigate the use of Gagne's instructional events across various learners and heterogeneous populations. Additionally, feedback, often incorporated with the use of Self-Assessment Questionnaires, and memory tests that assess long-term retention, could increase the validity of the method. As stated by Cook[18] and Swanwick[19], it is important to use simulation and blended learning as instructional methods that complement traditional approaches, making them more suitable for current educational delivery systems. Similarly, Dent and Herdon[20] emphasize the practical applications of these instructional models in medical education to bridge theory and practice. Greenhalgh[21] also highlights the importance of evidence-based approaches in improving teaching outcomes. Cantillon and Wood[22] also advocate for the integration of these instructional models to enhance learning and teaching in medical fields.

Limitations of study

The study was carried out on a small group of postgraduate residents (PGRs) and may not be well generalizable to a broader pool of medical learners. As this study investigated only one educational level, using homogeneous sample of students, the results may have limited generalizability to other learning environments and it may not evaluate the long-term effectiveness of Gagne's instructional model. Further studies with larger cohorts and diverse educational contexts are recommended to validate these findings.

CONCLUSION

This study concludes that the implementation of Gagne's Nine Events of Instruction in teaching sessions of postgraduate residents in Obstetrics and Gynaecology significantly enhances learning in terms of improvement of academic score. Gagne's nine events of instruction provide a practical and effective framework for enhancing student engagement, retention, and academic performance compared to conventional teaching strategies.

Through engagement and systematic learning approaches, this model bridges the gap between traditional and modern teaching approaches, leading to better educational outcomes.

AUTHORS CONTRIBUTION

Conception, designing, writes ups, data collection and management.

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