Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: xyz

ENHANCING ANATOMY REVISION THROUGH IMAGE-BASED, PART-COMPLETION GOOGLE FORMS: A CROSS-SECTIONAL STUDY AMONG FIRST-YEAR MBBS STUDENTS

Dr Sonali Kataria[1], Dr Anant Kumar[2], Dr Vanita Gupta[3]

[1]Assistant Professor, Anatomy, G S Medical College & Hospital, Hapur
[2]Assistant Professor, Anatomy, G S Medical College & Hospital, Hapur
[3]HOD & Professor, Anatomy, G S Medical College & Hospital, Hapur

ABSTRACT

Background:
Digital formative assessments are increasingly used in medical education, but evidence on their impact when integrated with students' own dissection images remains limited. This study evaluated the usefulness, engagement, and learner satisfaction associated with an image-based, part-completion Google Form designed to support revision of upper limb anatomy.
Methods:
A Google Form containing informed consent, demographic fields, ten short-answer questions based on images from students' own dissections, a five-item engagement/satisfaction Likert scale, and an open-ended feedback prompt was administered to all first-year MBBS students (n=204). Students completed the form on their mobile phones during a scheduled revision session. Quantitative data (accuracy, completion time, perception scores) and qualitative feedback were analyzed descriptively.
Results:
204 students completed the form (response rate 81.6%). Performance on image-based questions was high: 60% scored 90%, 25% scored 80-90%, 15% scored 70-80%, while only 10% scored below 70%. Mean completion time was 26 minutes. Perception scores indicated strong acceptance (mean 21.6 ± 2.3 out of 25). Students agreed that using images from their own dissections enhanced recall (93%) and improved conceptual understanding (90%). Thematic analysis of comments revealed three dominant themes:
ownership & authenticity of learning, **focused independent engagement**, and **reduced anxiety with increased motivation**.

Conclusion:
The image-based, part-completion Google Form was well received, fostered strong engagement, and served as an effective tool for non-threatening revision. Embedding students' own dissection images appears to enhance authenticity and ownership of learning. The model can be replicated for other anatomical regions in early medical education.

Keywords: anatomy education, Google Forms, formative assessment, undergraduate medical students, dissection-based learning, engagement.

INTRODUCTION

Based on several resources, it seems that there is a need for introducing & implementing newer methods of teaching Anatomy. So far, reviews[1] suggest that the most effective way to successfully teach anatomy to medical undergraduates is by combining various educational resources to support one another, and students seem to learn more efficiently when multidimensional ways are combined together. Early medical education increasingly incorporates digital tools to reinforce learning, improve engagement, and reduce reliance on high-stakes assessments. Anatomy, particularly dissection-based learning[2], demands repeated visualization and active revision. Traditional methods such as MCQs or viva-style spotters often emphasize recall without contextual continuity, and many students find them stressful or insufficiently interactive.

Several studies have examined the effects of Virtual / Digital Formative Assessments and the enhancement of scores on the following cumulative evaluation. The approaches that have been suggested lead to better learner engagement, and reduction in unnecessary thinking. Also better detection of learning deficits is achieved through the formative response method[4, 5, 6,7]

Google Forms has emerged as a convenient, low-cost platform for creating mobile-friendly, image-based assessments[3]. Previous studies in medical education have shown that digital formative assessments can support self-directed learning, encourage repeated exposure to anatomical images, and provide rapid feedback. However, very few studies have specifically examined the use of students' own dissection images—a unique pedagogical element that may strengthen authenticity, memory consolidation, and emotional connection with the learning material.

The present study aimed to evaluate the usefulness, engagement, and satisfaction associated with an image-based, part-completion Google Form created using photographs from students' own cadaveric dissections, osteology specimens, and surface marking sessions. The focus was not on summative scoring but on assessing whether this digital tool facilitated meaningful revision of upper limb anatomy.

METHODS

Study Design and Participants

A cross-sectional, observational study was conducted among first-year MBBS students at a large teaching institution. **204 students** (out of 250) enrolled in the anatomy course participated.

Structure of the Google Form

The Google Form administered during the scheduled revision session contained:

1. **Informed consent section**
2. **Demographic information**
3. **Ten image-based, short-answer anatomy questions**

o Images depicted the cubital fossa, pectoral region, scapular region, axilla, front of arm and forearm, humerus, radius, ulna, clavicle, scapula, and selected surface landmarks. o All images were captured from the students' own dissection tables, cadaveric specimens, and bone sets used during the module.

4. **A 5-item Likert perception scale**

o Rated student engagement, involvement, ease of use, and satisfaction (1 = strongly disagree to 5 = strongly agree). o Total possible score: 5–25.

5. **One open-ended qualitative feedback question Procedure**
Students completed the entire form on their mobile phones in the dissection hall under faculty supervision. They were informed that the activity was purely formative and would not contribute to internal assessment marks. The Google Form auto-recorded accuracy (manually evaluated by faculty later), timestamp data, and perception scores.

Data Analysis
Quantitative variables were analyzed descriptively (percentages, mean ± SD). Qualitative comments were coded independently by two faculty members and grouped into themes through thematic analysis.

RESULTS

Participation and Completion
204 **students** completed the form in full (response rate 81.6%).
Performance on Image-Based Questions
Performance demonstrated strong engagement with the visual content:
- **60%** scored **90%**
- **25%** scored **80-90%** • **15%** scored **70–80%** • **5%** scored **60-70%** • **5%** scored **less than 60%** The **mean completion time** for the form (all components) was **26 minutes**.

Learner Perception and Satisfaction
The mean perception score was **21.6 ± 2.3** out of 25.
Item-wise responses (agreement = "agree" + "strongly agree"):
- Helped revise upper limb anatomy effectively: **93%**
- Images from their own dissections improved recall: **90%**
- Engagement was higher than regular assessment formats: **89%**
- Google Form was easy to use on mobile phones: **95%**
- Would like similar activities for other regions: **88%**

Qualitative Themes
Analysis of open-ended comments revealed three prominent themes:
1. Ownership & Authenticity
Students emphasized the value of recognizing structures from their own dissection tables. They described the experience as "personally connected," "more real," and "easier to remember."
2. Focused Independent Engagement
Because questions required short text responses (not MCQs), the hall remained quiet, with minimal whispering. Students reported improved focus and less reliance on peer cues.
3. Reduced Anxiety, Increased Motivation
Students enjoyed the non-threatening, revision-oriented format and reported heightened curiosity and confidence.

DISCUSSION

This study demonstrates that an image-based, part-completion Google Form using students' own dissection photographs can serve as an effective and engaging tool for revising upper limb anatomy. High completion rates, strong performance, and positive perception scores indicate that this method enhances learner involvement without the stress associated with traditional assessments.
The use of personalized dissection images appears to be a key factor contributing to heightened ownership and authenticity. Prior literature highlights that contextualized anatomical images improve

visuospatial learning and long-term memory; our findings support and extend this principle by showing incremental benefits when the images originate directly from learners' own cadaveric work. The reduction in distractive behaviors (whispering, guessing) observed during the session reinforces the value of short-answer formats in promoting independent thinking. The mobile-friendly, low-cost nature of Google Forms further suggests high scalability and replicability.

CONCLUSION

The image-based part-completion Google Form was highly effective as a revision tool for upper limb anatomy. Students reported strong engagement, found the images meaningful due to their personal relevance, and expressed eagerness for similar activities in future modules. Incorporating such digital, learner-centered revision tools can significantly enrich the anatomy learning experience in early medical education.

FIGURE LEGENDS

Figures 1-5 - Distribution of perception scale scores among students.
Figures 6-9 - Word cloud representing common themes from qualitative feedback.

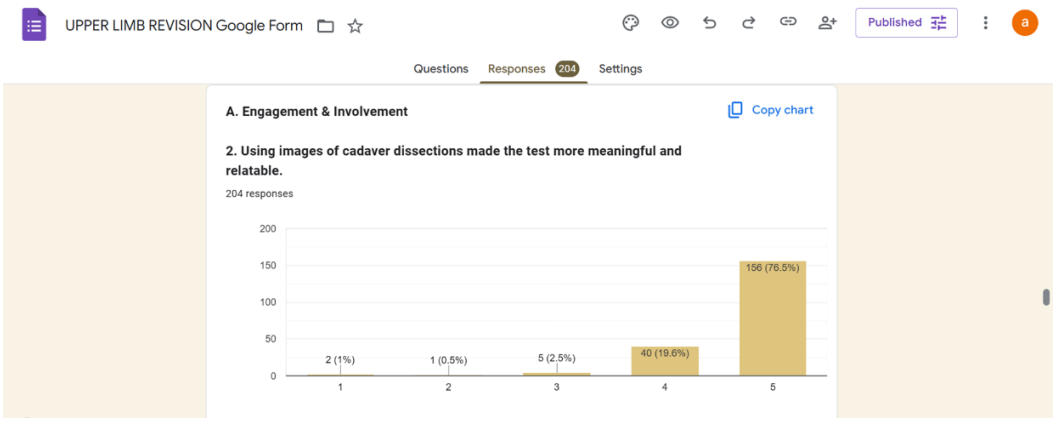


Figure 1

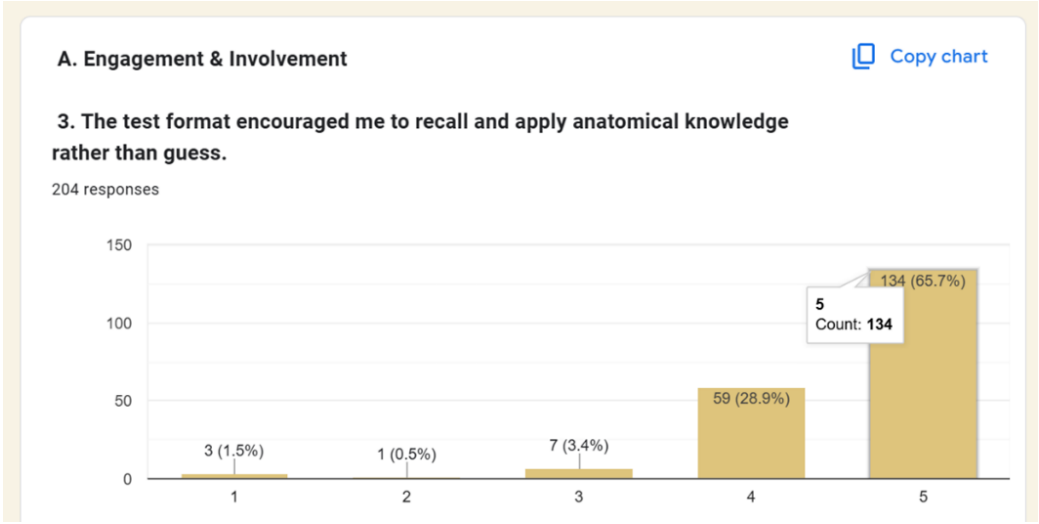


Figure 2

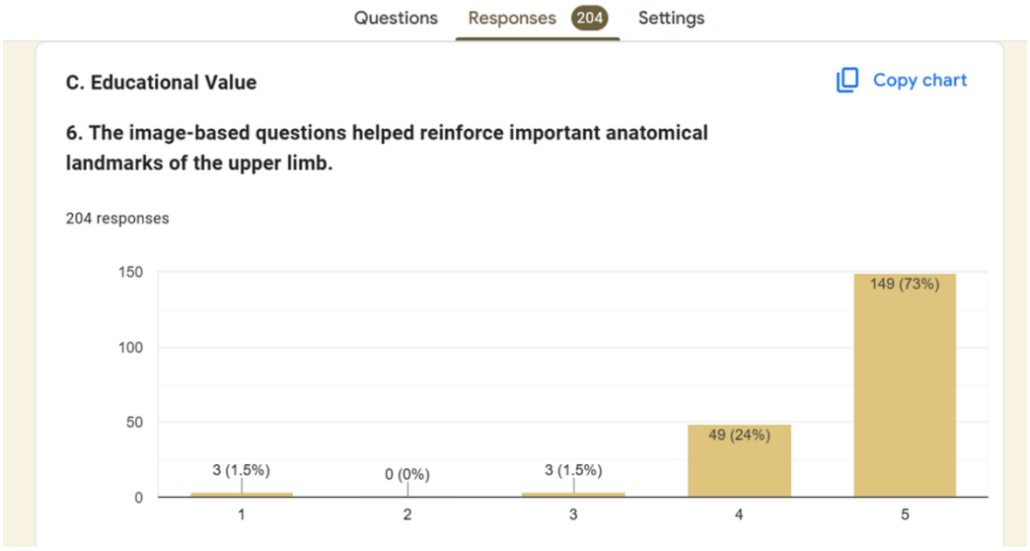


Figure 3

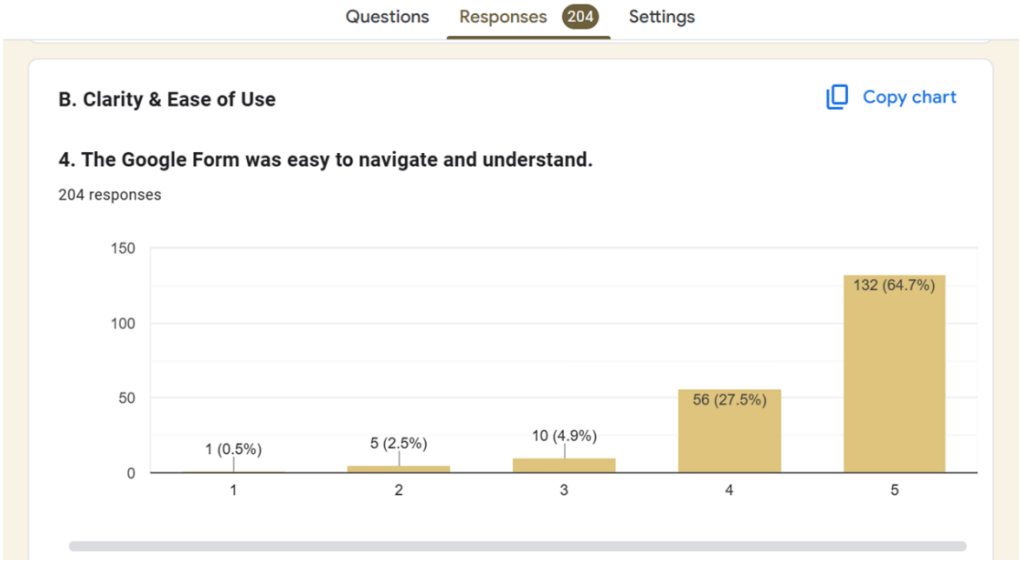


Figure 4

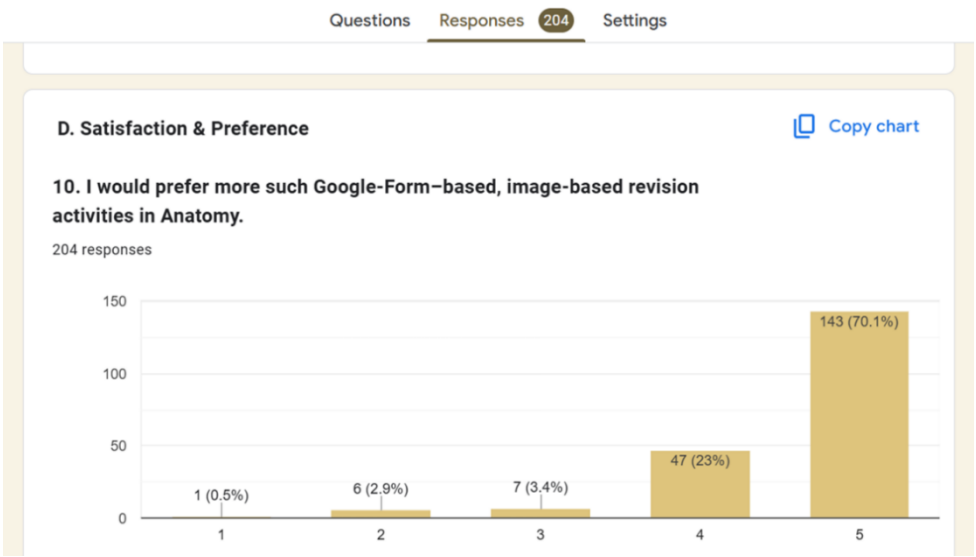


Figure 5

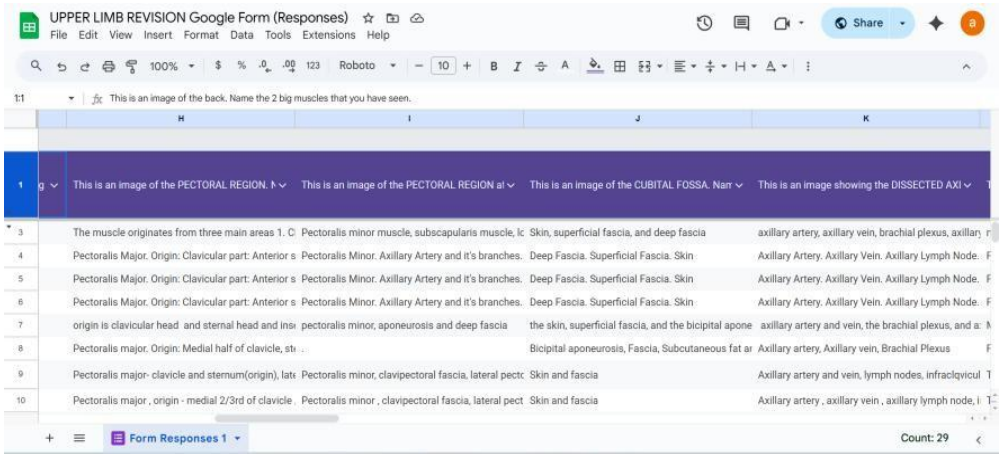


Figure 6

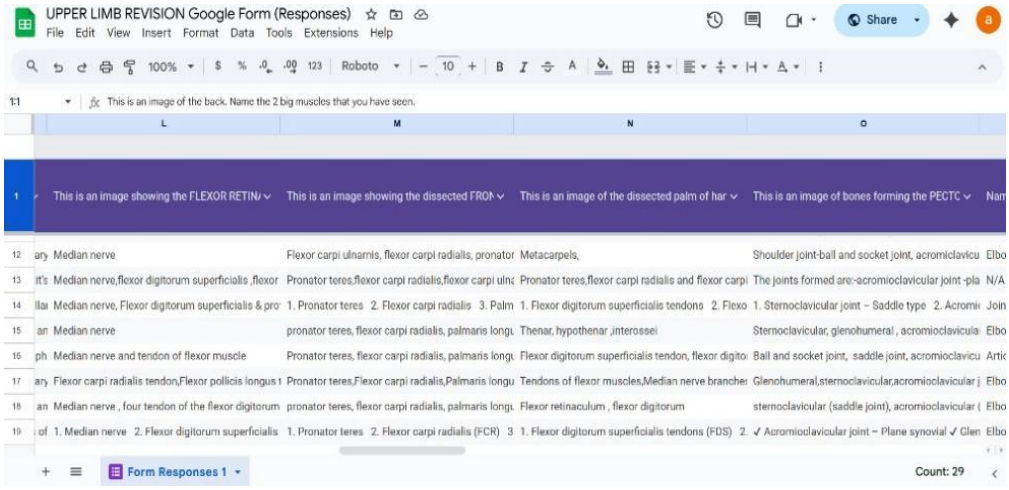


Figure 7

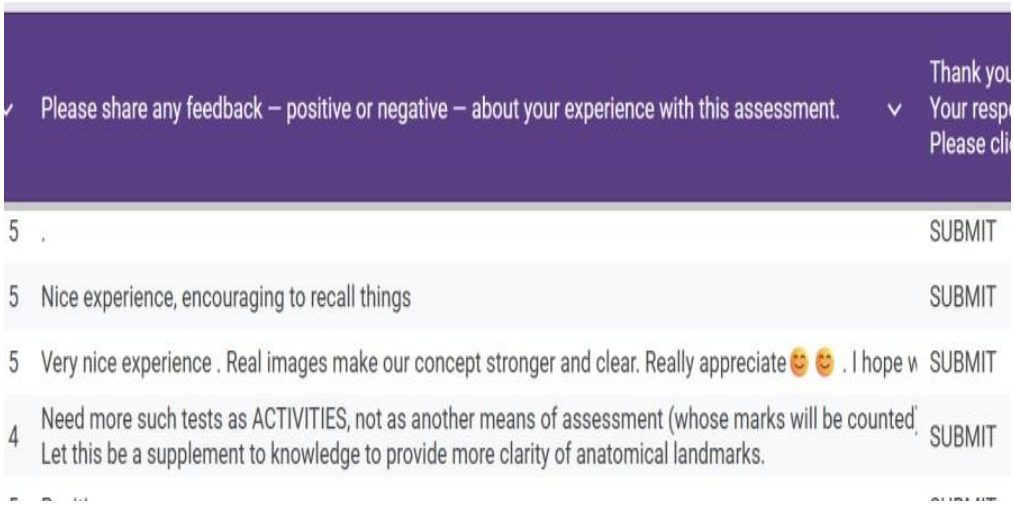
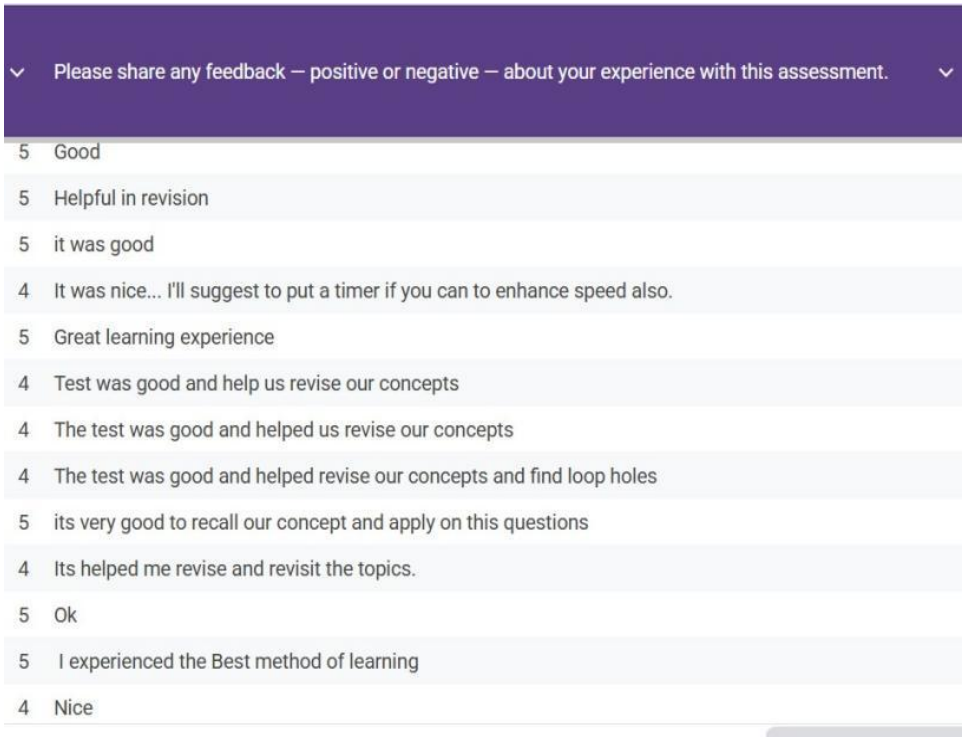


Figure 8



	Please share any feedback – positive or negative – about your experience with this assessment.
5	Good
5	Helpful in revision
5	it was good
4	It was nice... I'll suggest to put a timer if you can to enhance speed also.
5	Great learning experience
4	Test was good and help us revise our concepts
4	The test was good and helped us revise our concepts
4	The test was good and helped revise our concepts and find loop holes
5	its very good to recall our concept and apply on this questions
4	Its helped me revise and revisit the topics.
5	Ok
5	I experienced the Best method of learning
4	Nice

Figure 9

REFERENCES

1. Mohamed Estai, Stuart Bunt. Best teaching practices in anatomy education: A critical review. Ann Anat 2016 Nov; 208:151-157
2. K M Patel, B J Moxham. The relationships between learning outcomes and methods of teaching anatomy as perceived by professional anatomists. Clin Anat 2008 Mar;21(2):182-9.
3. Sanjyoti Panchbudhe, Simran Shaikh, Hanmant Swami, Charushila Y Kadam, Ramchandra Padalkar, Rajni R Shivkar, Gouri Gulavani, Supriya Gulajkar, Shubhangi Gawade, Farheen Mujawar. Efficacy of Google Form–based MCQ tests for formative assessment in medical biochemistry education. J Educ Health Promot 2024 Mar 28;13:92.
4. Kavitha Nagandla, Sharifah Sulaiha, Sivalingam Nalliah. Online formative assessments: exploring their educational value, J Adv Med Educ Prof. 2018 Apr;6(2):51–57.
5. Gikandi JW, Morrow D, Davis NE. Online formative assessment in higher education: A review of the literature. Comput Educ. 2011;57:2333–51.
6. Cook DA, Levinson AJ, Garside S. Time and learning efficiency in Internet-based learning: A systematic review and meta-analysis. Adv Health Sci Educ. 2010;15:755–70.
7. Carrillo-de-la-Pena MT, Bailles E, Cseras X, Martinez I, Ortet G, Perez J. Formative assessment and academic achievement in pre-graduate students of health sciences. Adv Health Sci Educ. 2009;14:61–7.