

# Preferences of Bangladeshi Anatomists on the use of Different Styles of Presenting Embryology Illustrations in Powerpoint Slides.

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Received: June 2020

Accepted: June 2020

## ABSTRACT

**Background:** Embryology is a visual subject that relies heavily on illustrations in understanding the subject, as most of the structures are not seen by naked eyes. Embryology lectures have mostly delivered using PowerPoint slides to show the microscopic structures involved during various stages of development. However, the styles of projecting the illustrations on PowerPoint slides differs greatly among the teachers. This different style of presentation is the deciding factors which makes the classes interesting or not. Therefore, this study was conducted to assess the preferences of different styles used by the teachers in presenting Embryology illustrations in PowerPoint slides resulting in students becoming better and lifelong learners. **Methods:** This descriptive cross-sectional study was conducted in the Department of Anatomy, Bangabandhu Sheikh Mujib Medical University using self-administered questionnaire collected from 40 anatomists of Bangladesh who teaches embryology using PowerPoint Slides in their classes. **Results:** Judging by the preferences of the anatomists, using more illustration than text, light homogeneous background, labelling only the relevant parts and using the collected illustration after making the labels larger were found most preferred by the teachers in presenting embryology illustrations in PowerPoint slides, which they felt would be more effective in understanding the subject. **Conclusion:** The idea on common preferred styles in presenting Embryology illustrations in PowerPoint slides should benefit the learners by capturing their focus and attention on the topic to enhance learning.

**Keywords:** Embryology, Illustrations, PowerPoint Slides.

## INTRODUCTION

Embryology is considered as the most complex systems of the human body not only for its dynamic complicated structures involved in different developmental stages but also for its complicated microscopic connections and functions.<sup>[1]</sup> To teach such dynamic complicated microscopic structures in lecture, embryology illustrations are used to capture the attention, aid retention and enhance understanding of the students. Thus, Embryology cannot be taught only using text.<sup>[1]</sup>

The importance of illustrations in Embryology is possibly understood by every author, editor or teacher in Anatomy. Almost every new edition of Embryology book or atlases looks for new or modified illustrations that signifies the importance of illustration in learning. The presentation of pictures, illustrations, diagrams and models help learners to develop mental images, which facilitate understanding of spatial relationship.<sup>[2]</sup> However, it

is assumed that very few teachers would think seriously about the different characteristics of different styles of illustration or try to understand their specific impact on learning. Thus, even fewer would be able to ensure effective use of these characteristics in their teaching.<sup>[2]</sup> This is because no formal training available on this aspect of anatomy. Moreover, there is not much of work available in literature on such characteristics.

The anatomists involved in education are constantly looking for the best way to transmit this visual information to students.<sup>[3]</sup> Multimedia has revolutionized the way the subject is being taught in most universities around the world.<sup>[4]</sup> As a presentation Software, Microsoft PowerPoint has been increasingly adopted by the young generation of teachers in many medical colleges for teaching Embryology. The reason behind its extensive use is the complexity of the embryological illustrations which is very difficult to be drawn using chalk and board or Over Head Projectors (OHP). The readily availability of varieties of illustration over the Internet, e-books and atlases that can be scanned and the shorter time involved in the customisation of these illustration have led most of the young generation teachers to prefer using PowerPoint for their lectures. Currently, almost every teacher uses

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PowerPoint, which is the most popular multimedia software for presenting different illustrations in classroom worldwide.<sup>[4]</sup> This teaching tool is not an exception in lecture classes across medical colleges in Bangladesh where Embryology is taught to the undergraduate students through lectures using PowerPoint, the only method of teaching which can cover a large number of audiences in the shortest period of time. Obviously, using PowerPoint presentations has been an accepted way of teaching as the number of students attending is too large in comparison to the availability of teaching staff and hours assigned for Embryology.<sup>[5]</sup>

Therefore, use of different styles of illustration in teaching is essential for developing proper understanding of the system. There are many articles available in the field of using illustrations in PowerPoint in medical education and none of them addressed the different styles of presenting illustrations in PowerPoint slides.<sup>[1-4]</sup> In addition, resources available to guide instructors and course developers in graphic design for computer generated presentation software, guidelines to enhance the instructional value of the resulting presentations are lacking.<sup>[6]</sup> The teacher prepares lectures using different styles to present illustrations in PowerPoint slides according to their own preferences that mainly depends on available time and knowledge to edit illustrations. However, common preferences of using different styles of presenting illustration in PowerPoint among the teachers have not been studied before in Bangladesh.

Therefore, the present study was designed to identify four commonly used styles of presenting illustrations in PowerPoint slides and look at the possible preferences by the teachers that would be effective in understanding embryology.

## MATERIALS AND METHODS

This cross-sectional descriptive study was purposively conducted amongst 40 anatomists of Bangladesh who teaches Embryology using Power Point in their classes. According to the list maintained with Anatomical Society of Bangladesh (2014), there were 130 anatomists at the level from Assistant Professor to Professor in the country. Through telephonic communication, it was found that 40 of them were actively engaged in teaching Embryology to medical students using PowerPoint slides in their lecture classes and agreed to participate in the study. The study was conducted at Department of Anatomy, Bangabandhu Sheikh Mujib Medical University (BSMMU). Ethical clearance was obtained from Institutional Review Board (IRB) of BSMMU.

### The data collection comprised two steps as follows:

**Step 1:** Identifying four commonly used styles of presenting illustration in PowerPoint slides.

Four different styles of embryology illustrations in PowerPoint slide were identified from the PowerPoint presentation slides used by embryology teachers in their previous classes and those four most commonly used styles were selected for the study.

### Four different styles were:

**Style 1:** Text-illustration mixed:

- More text than illustrations.
- More illustrations than text.
- Both in similar proportions.

**Style 2:** Background. Use of different background on which an illustration is placed:

- Light coloured background
- Dark coloured background
- Slightly decorated background not related to subject
- Slightly decorated subject related background
- Vibrantly decorated background
- Heavily decorated background

**Style 3:** Illustration labeling:

- Using illustration labeling only relevant parts.
- Using an illustration labeling all its parts.

**Style 4:** Illustration modification:

- Using a collected illustration after making the labels larger.
- Using a collected illustration as it is.

The style 1 can be presented in three different ways, style 2 in six different ways, style 3 and 4 in two different ways. Similarly, one slide each was prepared on PowerPoint for each ways under each style using different embryology illustrations. So thirteen slides were prepared on PowerPoint addressing the all the ways under each styles.

The illustrations were selected from recommended medical embryological text books and atlases in Bangladesh. They are: Langman's Medical Embryology by T.W Sadler (12th edition); Netters Atlas of Human Embryology by Lary R. Cochard, (updated edition); Histology, A Text and Atlas by Michael H. Ross and Wojciech Pawlina, (6th edition) The illustrations were edited and modified using 'Adobe Photoshop version 7.0' and then they were placed in 'Microsoft Office PowerPoint 2007' maintaining all the aesthetic side of the slides as far as possible.

**Step 2:** Examining the possible preferences of Embryology teachers.

Thirteen illustrations prepared on PowerPoint slides were sent to embryology teachers via e-mail. The participants were required to choose one illustration from each styles, which they preferred to use in their classes for effective learning. Their feedback was collected via the same e-mail; and analyses were done. Microsoft Excel Worksheet 2016 was used for calculating percentage and frequencies of responses to create statistical diagrams.

**RESULTS**

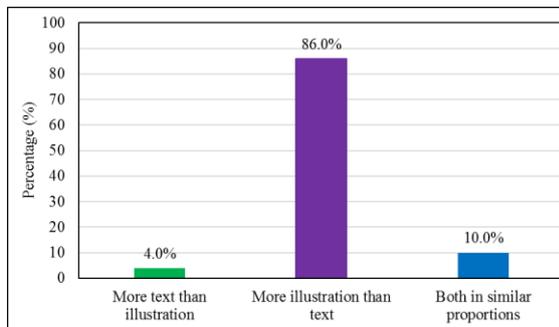
Forty anatomists who teach Embryology using PowerPoint in their classes were included in our study. Majority (95.0%) of them had Master of Philosophy (MPhil) degree in Anatomy and half (50.0%) of them were Assistant Professor by designation. More than half (62.5%) were working in government medical colleges and half (50.0%) of teachers had Embryology teaching experience of one to five years [Table 1].

**Table 1: Personal information regarding the anatomists participating in the study (n=40).**

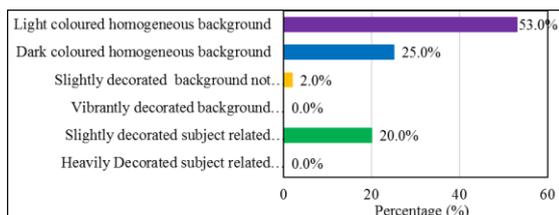
Information	Frequency (%)
<b>Academic qualification</b>	
M Phil	38 (95.0%)
MS	2 (5.0%)
<b>Designation</b>	
Professor	7 (17.5%)
Associate Professor	13 (32.5%)
Assistant Professor	20 (50.0%)
<b>Place of work</b>	
A government medical college	25 (62.5%)
Private medical college	15 (37.5%)
<b>Experience in teaching Embryology</b>	
<1 year	1 (2.5%)
1-5 years	21 (52.0%)
6-10 years	18 (45.0%)

n: Number of anatomists participating in the survey.

Most of the participating anatomists (86.0%) preferred illustration-based Embryology PowerPoint slides that are more effective if they had more illustration than text [Figure 1].



**Figure 1: Preferences of illustration and text in embryology PowerPoint slides by the participating anatomists to be more effective in learning (n= 40).**

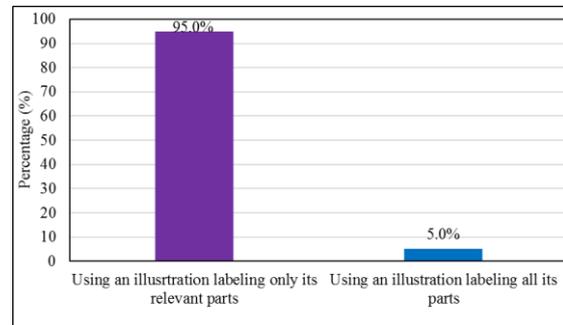


**Figure 2: Preferences of the participating anatomists for different types of background (n= 40).**

Regarding the use of different background on which an illustration is placed, light-coloured homogeneous

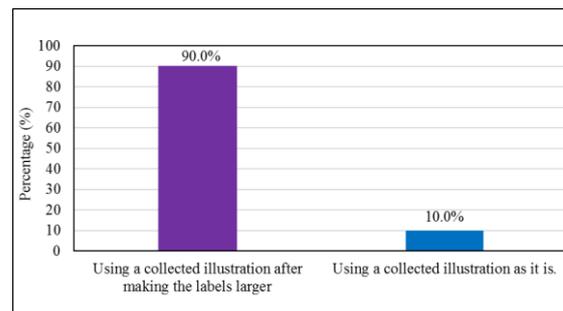
backgrounds was preferred by around half of the participating anatomists (53.0%). No anatomists preferred either heavily decorated subject-related or vibrantly decorated backgrounds. [Figure 2].

Almost all (95.0%) of the participating anatomists preferred an illustration labeling only its relevant parts to that of using an illustration labeling all its parts [Figure 3].



**Figure 3: Preference of participating anatomists for using an illustration labeling only its relevant parts and using an illustration labeling all its parts (n= 40).**

Most of the anatomists (90.0%) preferred using a collected illustration after making the labels larger to using a collected illustration as it is [Figure 4].



**Figure 4: Preferences of participating anatomists of using a collected illustration after making the labels larger and that of preferring using a collected illustration as it is (n= 40).**

**DISCUSSION**

Forty anatomists of Bangladesh were engaged in teaching embryology through lectures using PowerPoint in their classes where 95.0% of them with Master of Philosophy (MPhil) degree in anatomy and 62.0% were working in government medical colleges. Half of them were Assistant Professor and more than half (52.0%) had one to five years of teaching experience in embryology. It is clear that the teachers were well qualified, young and experienced in teaching this difficult subject ensuring brighter future of medical education in Bangladesh.

In our study, most of the anatomists (86.0%) preferred using more illustration than text in their lectures. Because the embryonic body undergoes dynamic morphologic changes during

organogenesis,<sup>[6]</sup> it is essential for teachers to help student visualize the process by using illustrations.<sup>[7]</sup> This is well supported by another study where there was an overwhelming report that image in PowerPoint lecture enhanced learning of the students.<sup>[8]</sup> The basic rules for PowerPoint presentations also recommend using minimal text with more illustrations.<sup>[9]</sup> This is very essential and timely understanding considering the increasing number of illustrations found in any Embryology textbook in subsequent editions. The huge amount of illustrations available online, either linked to the textbooks or university websites or otherwise should add to this understanding. This also conforms to the fact that much of embryology information, especially the molecular regulation and signaling, gametogenesis, organogenesis as well as of birth defects and formation of nervous and vascular system are difficult to grasp without visual support because of their wide spread locations and distribution and the often absence of any concrete shape.

One study recommended use of either white on black or black on white background that enables the students to see clearly.<sup>[10]</sup> This recommendation matched with the results in our study where majority of the teachers preferred light colour (53.0%) and dark colour (25.0%) as the background of their slides. Such background creates better contrast for the students to follow the lecture resulting in better understanding of the subject. In addition, the background of a slide especially its colour is such an attribute, the like / dislike which is very likely to be determined by personal taste. However, it is understandable that the most important characteristic of a background should be what makes / keeps the foreground material legible.

Almost all the anatomists (96.0%) preferred using illustration labeling only relevant parts. The illustrations for embryology teachings are normally taken from recommended Embryology text books and atlases with all the parts labelled to ensure disseminate maximum and accurate scientific information. Using those illustrations, the students might remember minor points and miss the key points as the presentation is projected only over limited time. To keep the relevant labels on the illustration, Microsoft Paint application or any photo editor applications are used to erase the irrelevant labels. Therefore, the teacher has to do heavy editing works to make the audience assimilate information better.<sup>[11]</sup> It is evident from the preferences by the anatomists that clearly labelled diagrams with only relevant labels facilitated their learning. Whereas too many labels on an illustrations would be confusing and clumsy.

Majority of the anatomists (90.0%) preferred using illustration after making the labels larger than using collected illustration as it is. This was chosen keeping in mind the ever-increasing number of

medical students yearly. For lecturing to large groups, the illustrations should be sufficiently large enough for all in an auditorium to see.<sup>[3]</sup> The labels has to be very clear, interesting, attractive, and professional to make sure that every words can be read easily from the back of the room.<sup>[9]</sup> This, after correctness, legibility seems to be the most important attribute of a label to be considered.

## CONCLUSION

The study concluded that the above preferred styles of presenting embryology illustration in PowerPoint slides could be a better tools in lecture classes, thereby assisting in capturing concentration and interest of students in learning. Initially, the teacher has to put lots of hard work in editing every illustration that is needed for the lectures, in order that the refined illustration presents students with an efficient and accurate way to receive the information and enrich their studying experience. The present study has paved the way for teachers of embryology by highlighting important points on the use of different styles of embryology illustration in PowerPoint presentation. However, given the nature of cross-sectional descriptive design in this study, future research that can warrant the cause and effect of this teaching approach should be considered. Therefore, the findings can be used as evidence-based baseline information for researchers who are interested in designing effective approach for teaching Embryology by examining teachers and learners' perspectives as well as students learning outcomes in this regard.

### Acknowledgements

This study was a part of postgraduate thesis. The author would like to thank all the teachers across the country who participated in this study and teachers and staffs at Department of Anatomy, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.

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**How to cite this article:** Dorji G, Wetasin K, Chhezom K, Uddin ME, Wangmo S. Preferences of Bangladeshi Anatomists on the use of Different Styles of Presenting Embryology Illustrations in Powerpoint Slides. *Ann. Int. Med. Den. Res*. 2020; 6(4):ME22-ME26.

**Source of Support:** Nil, **Conflict of Interest:** None declared