

# Application of Lesson Plan towards Designing and Developing of a Module in a Blended Curriculum for Self-directed and Student Centred Learning Approach during COVID-19 Crisis

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**Abstract:** *Blended learning takes best of both face-to-face and online learning, combined with technology and readily be transferable to complete online delivery. This has become imperative in meeting the challenges of COVID-19 like pandemic enforced Movement Control Order (MCO). The conceptual module is a lesson plan developed as a short course (module) that combines the best features of traditional face-to-face (F2F) with online learning activities. The current approach provides a design framework and strategies for continuing teaching and learning experience without any interruption. The approach adopts an educational pedagogy that leverages on technology and provides interactive online teaching materials combined with traditional place-based classroom methods. Conceptualising assessment for learning is best applied in this module with formative assessment as test of prior knowledge. Continuing learning with self-assessment as visit to online virtual medical clinic (VMC) that enhances long term retention and potentials for lifelong learning. The objective is to meet the challenges of restrictions to F2F instructions with personalised online learning without interruption of curriculum delivery and to continuing teaching and learning with a personalised online learning experience. The Project is designed as hybrid instructional strategies that follows learning resources and determines leaning activities applied to Gagne's 9 events to meet the learning outcome. Blended with in-person and remote instructional methodology, the module is transferable to complete online delivery. The module aims to give students control over time, pace, path and place of learning and self-assessment eliciting learner's metacognitive skills. Lesson plan as a module can provide students to access and acquire knowledge and skills with values driven practice of their clinical education in a personalised learning environment at different levels of their training.*

**Keywords:** Lesson plan as module, Instructional design, Gagne's 9 events, Personalised learning, Blended learning approach, Online learning

## 1. Introduction and Background

Blended learning curriculum that takes the best of both of face-to-face and online learning has been practiced by many institutions. Institutions with hybrid curriculum found themselves in a better position to provide continue learning environment to students against those purely practicing traditional teaching modes in delivering the curriculum. Many institutions running medical education programmes in a panic have hastily embraced technology resulting in undue faculty and learner's anxiety. Besides, many other humanity issues have also confronted the world with emerging educational challenges [1]. Teaching faculty has additional responsibility of researching and publishing beyond teaching and assessing alone [2], in a swiftly designed and developed adaptive and transformative methods. Anxiety and fatigue among teaching faculty is evident when they forced to swiftly design and develop adaptive and transformative teaching methods, apart from the additional responsibility of doing research and publishing. This becomes a necessity if COVID-19 pandemic and MCO continues. This trend will continue, if the Covid-19 pandemic and MCO continues for the coming months and years. Clinical postings during the COVID crisis has become the cornerstone of clinical training in medical profession [3]. Most medical schools

were not prepared for such drastic changes and some have struggled to come up with alternative methods to traditional learning, which comprises of direct lecturing in classes, on-site clinical examination with direct patient encounter and clerking [4]. On the other hand, rest of the schools have closed their doors until further notice [5]

Delivery of medical education is under enormous pressure in continuing clinical teaching, keeping to stay safe policy for both students and faculty. Consideration behind these challenges made it imperative to review the strategies of F2F learning to a more flexible emergency remote learning procured for students. A breakthrough to adapt emergency remote learning and online teaching using virtual e-learning tools has several advantages and disadvantages. These depend on the institutions' preparedness for quality technological infrastructure of the facilities, faculty development and more importantly educational pedagogy and standardization and quality of teaching. Virtual learning has provided easy access to learning materials [6] that may facilitate students self-directed and personalised learning experience during the COVID crisis.

The current work is an in-depth evaluation of a lesson plan developed as per the school policy. An example, which could be a surrogate of all lesson plans a theme based on

Volume 9 Issue 11, November 2020

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neck swellings taught in year 4 using Task-based Learning method [7]. A lesson plan format adapted by the school was reviewed using a validated lesson plan evaluation form [8]. The innovative lesson plan applied to a module is a step forward in this direction, which is a collaborative effort between the faculty innovative initiatives and the team of e-Learning department in the International Medical University (IMU). Given the constraints of F2F learning and restrictions for F2F education, an online learning facility becomes imperative to continuing teaching and learning environment. The current conceptual model is a timely response to that call. This annotated document is a way forward and is aligned with institutional practice of transformation of all the lessons/topics to be prepared as a structured lesson plan using Gagne's 9 instructional events [9]. The lesson plan aims to rearrange the F2F traditional curriculum to a blended teaching and learning experience readily available to support students' continuing learning if the crisis continues or reappears in any other form in future.

## 2. Planning and Method of Delivery

Lesson plan applied to a module is a conceptual model designed as hybrid instructional strategies that curates and creates learning resources. Gagne's 9 events are applied to determine learning activities to meet the learning outcome. Blended with in-person and online remote instructional methodologies in a lesson plan applied to designing a module, which is transferable to complete online delivery in a challenging situation like MCO. The module aims at providing personalized approach to learning giving students control over time, pace, path and place of learning and self-assessment intended to promote learners' metacognitive skills. Current module is developed to provide a framework to guide an education response to pandemic impacts.

### A) Background Lesson Information

Implementation of undergraduate curriculum at different levels of training in modules/semesters in the authors' institution was explored for the neck swellings and its relation to anatomical triangles of neck and their content, nomenclature of lymph nodes in the neck and examination of head and neck. These topics related to neck swelling per se is considered important, and are required to be incorporated into curriculum and implemented with relevant learning intent in the preclinical phase. This knowledge subsequently can be used to monitor students' prior knowledge required for further training in clinical years.

Neck triangles and their identified content in anatomy or examination of neck lump, lymph node distribution or thyroid gland must have been taught in preclinical phase to actually rely on students' prior knowledge on this subject area in their subsequent training in clinical clerkship. The process of curating the content for students to revisit those content in order to be reminded of prior knowledge relevant to further teaching in clinical years was undertaken in this process. Considering that during a relevant placement (ENT), students will learn about neck lumps delivered through a theme of neck swelling using Task-based Learning, authors took this as a model case and decided to develop lesson plan applied to a module by creating prerequisite, learning outcome, resources, instructional

strategies, assessment and reflective practice using Gagne's 9-events instructional model

### B) Teaching and Learning Method

Any interactive teaching and learning method can be used however, in current design of a topic or lesson applied to a modular design, Task-based Learning was preferred for being already in practice in clinical phase of curriculum delivery. Any form of interactive and learning method could be employed in teaching neck swelling. However, 'task-based learning' (TBL, was selected as the preferred mode, as this has been in vogue in delivering the clinical curriculum in IMU. Other methods such as TBL (Team-based Learning), CBL (Case-based Learning), PBL (Problem-based Learning) or any other form of Flipped Classroom Model can be used to deliver the module in a synchronous online option provided in this module.

### Time Allocated for Task-based Learning Session:

- In all 90 minutes are allocated for the session.
- For method of TBL, the entire large group is divided into 3 smaller groups of 10-12 students per group.
- Task allocated to each subgroup is well defined for learning outcomes.
- 20 minutes for each small group discussion and 10 min for presentation by each group leader are allowed.
- This is followed by 20 minutes for overall discussion after the three presentation students to cross question each other under supervision.
- Final 20 minutes are used for debriefing by the facilitator and online assessment using an innovative Digital Scratching for Partial Credit (DS-PC) system that provides immediate feedback and self-assessment.

### C) Learning Approach Adopted: Gagne's 9 Events Instructional Design:

For instructional design Gagne's 9-events was used and readjusted for relevancy.

#### 1) Gain Attention (Introducing the topic/lesson):

Neck lumps, or masses, can have many possible causes from congenital to inflammatory, infective, neoplastic, and traumatic and autoimmune conditions. The most common lumps or swellings are enlarged lymph nodes. These can be caused by bacterial or viral infections, cancer (malignancy), or other rare causes. Other examples may include infections such as bacterial/viral sore throat, thyroid nodule, thyroid cancer, branchial cleft cyst, thyroglossal duct cyst, dermoid cyst and infectious mononucleosis. Swollen salivary glands under the jaw may be caused by infection or cancer. Congenital neck lumps in the muscles of the neck caused by injury or torticollis. Metastasis neck swelling worked up for primary in the head and neck region or elsewhere in the body. Diagnosis of neck lump is often made, which requires a sound knowledge of clinically and a good knowledge of anatomy of the neck, investigative skills and experience counts. Any lump that does not respond to medical treatment by general physicians and referred to surgeons for a thorough work up and close monitoring is to be reminded. The current lesson plan has been developed to impart importance of anatomy, knowledge of differential diagnosis, investigative and management skills and outcome of prognosis.

**2) Learning Objective and Outcome:****Learning Objective (what curriculum and faculty intend to teach):**

The objectives of current lesson plan are to ensure that the students are able to:

- identify and revise their knowledge that they have learnt earlier in semesters about the neck swelling
- carry relevant prior knowledge as a pre-requisite to attend Task-based Learning on neck swelling (e-Learning prior to the session)
- revise their knowledge of clinical anatomy about triangles of the neck and their content
- demonstrate an in-depth knowledge of communication skills, physical examination skills and the investigative skills
- list down the reasonable number of differential diagnoses and be able to critically review the neck swellings at each level of the clinical attribute
- propose an outline of the significant management plan and the prognosis of important neck swellings

**Learning Outcome (what students need to learn):**

After attending the Task-based Learning session on neck swelling learners should be able to:

- identify the neck triangles with boundaries and important content
- classify the lymph nodes in the neck using anatomical region or clinical levels
- identify the anatomical structures of oral cavity, oropharynx, nasopharynx and larynx.
- examine the oral cavity and oropharynx in the neck parotid with bimanual examination of parotid and submandibular gland.
- examine the larynx using IDL and the nasopharynx using posterior rhinoscopy
- demonstrate the interviewing and communication skills, physical examination skills, investigative skills in a patient with neck swelling
- analyse the differential diagnosis of neck swelling for etiological factors
- propose the outline of the management plan and prognosis relevant to important neck swelling.

**3) Recall Prior Knowledge (Prerequisite to attain the topic/session):**

If earlier learning resources relevant to topic of TBL cannot be established and curated, it needs to be created and links to be provided as it is done in ODL delivery[10] of modules in a programme. This will comprise of e-learning components of the lesson plan (20%-40%).

**Resources Curated:**

Examination of neck lump: Exploring the earlier curriculum delivery only examination of thyroid in semester 6 was curated from the previous learning experience, which students will be directed to revisit. Links are provided for head and neck learned in phase 1 (anatomy) and pathology of causes of neck swellings

**Resources Created:**

As in curriculum delivered in earlier phase of teaching and learning, sufficient evidence were not found (read the

background information) from anatomy courses in MBBS curriculum to proceed with current topic of TBL in undertaking the swellings of the neck. This information was sufficient to create resources relevant to current TBL session (40% from e-learning). Learning resources on neck swelling had to be created as there was insufficient evidence to show that this subject was sufficiently covered under 'anatomy' in the pre-clinical years. Useful hyperlinks were provided.

**4) Present Stimulus (Clinical Problem)**

An authentic case contextualised to neck swelling, either found in the ward or retrieved from an online source by the students in semester 7 (Year 4) during their, "Surgical Block" posting was derived.

**5) Guide Learning**

Students divided into three subgroups with allocated task (see above in LO) will be given 20 minutes for their group work brought for discussion by the members who have been assigned to prepare for the session by their respective subgroup members. This discussion will be fine-tuned what later will be presented by the group leader (decided by the subgroup) to present their work. Sub-groups are expected to deliberate on the assigned task for 20 minutes before consolidating this discussion for presentation to the main group. A leader is selected to present the deliberation for 10 minutes. This permits group dynamics and demonstration of leadership. After subgroup presentation of 10 minutes (accumulative 30 minutes) each, floor will be opened for large group discussion under supervision for monitoring the performance and providing the just-in-time feedback.

**Competencies to be acquired:** Objectives of neck swelling topic are for learners to acquire competencies. Competences to be acquired are:

- Knowledge about neck swelling (Knowledge domain)
- Demonstration of skills in history taking, physical examination, investigation and management skills (Psychomotor domain)
- Practice in clinical case of neck lump in TBL session with self-assessment (Affective domain).

**Learning Outcomes of sub-group:**

The large class will be divided into three groups assigned with different tasks to accomplish and discuss in large group session on swelling of neck in supervised TBL session.

**Task 1: Epidemiology****Learning Outcome:**

After attending the session students should be able to:

- Understand the burden of neck swelling frequency in general.
- Identify the pattern of neck swelling in Malaysian context.
- Establish the common neck swellings and rank them in order of incidence in Malaysian population.
- Describe the morbidity and mortality related to neck swellings.

**Task 2: Interviewing, examining and generating the hypothesis as differential diagnosis****Learning Outcome:**

After attending the session students should be able to:

- Interview the patient by asking relevant questions from history
- List the differential diagnosis (D/D) of neck swelling
- Perform the physical examination (PE) the patient with neck swelling
- Review the differential diagnosis with new information from PE

**Task 3: Investigation and Management of neck swelling:****6) Learning Outcome:**

After attending the session students should be able to:

- Suggest the investigations and review the D/D to establish diagnosis
- Outline the general management plan of a neck swelling
- Apply the relevant plan to the specific diagnosis under discussion
- Describe the prognosis of management in head and neck swelling relevant to the specific diagnosis

**7) Elicit Performance**

Main focus in eliciting performance would be ability to diagnosis and manage clinical problems presenting as neck swelling. More emphasis will be paid to discussion on differential diagnoses asking questions by the supervisor about the criteria to diagnose the clinical case given as a context to learning with TBL in event 4 of the Gagne's 9 instructions. Students are monitored and assessed for their performance in group discussion.

**8) Provide the Feedback (Debriefing by the Supervisor):**

Debriefing as an overview of neck swelling (7-10 min) contributed by the supervisor in which attention will be paid to what was correct and what was incorrect and needs improvement in future undertaking of same or similar case if encountered again.

**Assess Performance**

- Formative Assessment:** Formative assessment would include (i) scores as assigned on tests of prior learning in 1-3 iLecture and 4 examination and (ii) self-assessment (optional) as continuing learning using the option on VMC and responding to a case provided as Lateral Neck Swelling.
- Summative Assessment:** Students' performance will be assessed using a rubric as they perform in discussion as a group by the supervisor as well as an individual by an online test based on 5-10 items OBA and/or 2-3 SEQ.

**9) Enhance Retention**

Learners are encouraged to undertake self-assessment using virtual medical clinic (VMC) case (20 minutes encounter), a facility provided online to students as an optional exercise. The supervisor can visit the link to monitor interest in their life-long learning incentives.

**Resources Provided:**

- Essential reading

- Further reading
- Links
- Videos

**3. Discussion**

The principles driving lesson plan as a module will promote directed-self-learning in a personalised learning environment with eLearning component in a hybrid curriculum strategy. Module is promptly transferable from a conventional F2F delivery to an online learning in a challenging situation such as arising from COVID-19 pandemic [11]. Knowledge of anatomy as a test of prior knowledge in a formative assessment is the mainstay of this module with eLearning and self-evaluation. Lesson plan as a module can be used at different levels of training to acquire knowledge and skills with values driven practice of clerkship in a personalised learning environment. Continuing learning in this module is ensured by encouraging students to visit VMC and find an appropriate case for self-assessment with access to supervisor to monitor learners' lifelong learning initiatives.

The idea behind developing a lesson plan as a module is based on ILMU (Interactive Learning Material Unit) in IMU, which aims at achieving the minimal competency by every single student in a programme. The other driving lesson plan as a module is to promote directed-self-learning in a personalised learning environment provided on e-training portal of IMU. Such a learning environment is provided with eLearning component in a hybrid curriculum strategy. Lesson plan applied to a module for online-distant learning is provided with learning outline (see appendix) and students' guide

Topic in this module on neck swelling is created as well as curated to explore the learner's prior knowledge and skills in an integrated curriculum, which is mandatory to acquire further knowledge with experiential learning experience. Learning transferred to long term retention with initiative of lifelong learning is also aimed at. For instructional design, Gagne's 9 events have been employed. ELearning component has been ensured by 20%-30% weighting of learning activities refreshed as test of prior knowledge taught in curriculum in previous training. The rest of 70%-80% of module learning is planned as F2F or online in a contextualised Task-based Learning.

The topic of TBL is introduced with multiple common neck lumps pictures to visualize the disease pattern. Authentic task on neck swelling based on a case discussion is either found in the ward or retrieved from an on-line source by the students in their relevant semester of clinical posting. The task is divided into subtasks, each with its own learning outcome. Content to be presented is made feasible with chunking or scaffolding among the subgroup, created in advance by the academic office assigned with a leader. However, a good knowledge of clinical anatomy of the neck as a test of prior knowledge in a formative assessment is the mainstay of this module with eLearning and self-evaluation. Summative assessment is carried out by 10 items OBA for individual score multiplied by a team performance score

assessed by the supervisor in a F2F or online learning options depending on situation and facilities available.

After the test of prior knowledge online, the entire large class is divided into 3 subgroups. 20 minutes for each subgroup discussion + 30 minutes divided into 10 minutes for each subgroup presentation + 20 minutes for large group discussion, besides 10 minutes of debriefing and 10 minutes of online assessment. OBA uses PC-DA (Partial Credit Digital Assessment) system for scoring and immediate feedback[12]. Immediate feedback is also provided as a debriefing on neck swelling in a 7-10 mini-talk contributed by the supervisor in which attention is paid to what is correct and what is incorrect and needs improvement. Continuing learning in this module is ensured by encouraging students to visit Virtual Medical Clinic (VMC) and find an appropriate case for self-assessment, which is an optional exercise. This may help supervisor to monitor individual students undertaking for their initiative of lifelong learning.

#### 4. Conclusion

The Covid-10 pandemic has initiated the need for novel means of delivery of the medical curriculum. In this discussion, neck swellings are presented as a module employing lesson plan as the template incorporating task based learning. Using this approach it has been possible to transform education from conventional F2F teaching to a blended approach of online learning and remote learning. Applying Gagne's 9-events, a lesson plan can be utilized to accomplish effective learning outcomes. Pretest of prior knowledge, formative assessment, summative assessment and employment of VMC comprehensively covers all aspect of prescribed learning outcomes while personalizing learning.

The conceptual module in this context is a lesson plan developed as a short course (module) that combines the best features of traditional face-to-face (F2F) with online learning activities. The current approach provides a design framework and strategies for continuing teaching and learning experience without any interruption. The module aims at providing personalized approach to learning giving students control over time, pace, path and place of learning and self-assessment eliciting learners' metacognitive skills. Continuing learning in this module is ensured by encouraging students to visit Virtual Medical Clinic Lesson plan as a module can provide students to access and acquire knowledge and skills with values driven practice of their clinical education in a personalised learning environment at different levels of their training.

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**Appendix: Module (Lesson Plan) on Neck Swelling Outline for Semester 7 (Year 4, MBBS Programme) Clinical Posting of 2 Weeks**

E-learning Component (20%-30%)	20%-30% weighting of learning activity depends what has been taught in curriculum in previous training. <b>Materials curated:</b> Only 15% relevant to topic of the lesson plan could be curated in curriculum taught in earlier phase (preclinical). 1. Thyroid swelling in Semester 6 Link: 2. Neck triangles and its content Link: <b>Material Created:</b> 85% material was created (See Lesson Plan Guide)
F2F/ODL Component	70%-80% weighting of learning activity is delivered either Onsite (F2F) or online (ODL)

Topic No	Items/Topic	Learning Material and Learning Activities	Time (Minute)
	Briefing by Module Coordinator	How to learn in Lesson Plan Module on Neck Swelling?	
		<b>Learning Material:</b> VOR Lecture/Asynchronous	
1	Test of students' Prior Knowledge 1	Anatomy of the neck in context of neck triangles and its content	30
		<b>Learning Material:</b> (VOR iLecture 1, as test of prior knowledge /Asynchronous) Link:	
2	Test of students' Prior Knowledge 2	Classification (Level) of lymph nodes distribution in neck	30
		<b>Learning Material:</b> (VOR iLecture 1, as test of prior knowledge /Asynchronous) Link:	
3	Test of students' Prior Knowledge 3	Anatomical structures relevant to examination of the oral cavity, oropharynx, nasopharynx and larynx	30
		<b>Learning Material:</b> (VOR iLecture 1, as test of prior knowledge /Asynchronous) Link:	
4	TBL Tutorial	TBL Large Group Session, F2F or Online	90
		<b>Total</b>	180 (3 hour)
A	Assessment (Formative)	<b>Formative Assessment 1:</b> Examination of the oral cavity and oropharynx: Click the video link:	20
		<b>Formative Assessment 2:</b> Examination of the larynx (IDL): Click the video link:	30
		<b>Formative Assessment 3:</b> Examination of the nasopharynx (Posterior Rhinoscopy) Click link:	
		<b>Formative Assessment 4:</b> Examination of the neck lump: Click the video link:	20
		<b>Formative Assessment 5:</b> Self-assessment (optional) Managing a patient with lateral neck swelling on VMC, click the Link:	20
		<b>Total (Minutes)</b>	90 (1½hour)
B	Assessment (Summative)	<b>Summative Assessment 1:</b> Performance as a team in TBL Tutorial (Summative)	15
		<b>Summative Assessment 2:</b> Online Test with 10 items MCQ (OBA)	15
		<b>Total (Minutes)</b>	30
		<b>Total Assessment Time</b>	120 (2 hour)
		Overall Total Student Learning Time (Credit = 5/40 (Malaysian Notional Hour) = 0.125	300 (5Hour)