Practicing through Emergency Remote Learning: Transformation of Topic-specific Lecture into a Lesson Plan Experienced during the COVID-19 Crisis

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Abstract: *Medical education has been facing the unprecedented challenges of clinical teaching since the emergence of COVID-19 crisis early this year in 2020. Despite the crisis, many institutions have been continuing teaching without interruption. Current crisis was so sudden and unwarranted that many schools were shut down while other adopted to emergency remote teaching. Institutions with online and face-to-face (F2F) blended learning were in better position to face the challenge with little work to engage students with a compulsive student-cantered self-directed and personalised learning approaches as a solution. However, emergency remote learning came as the first experience by many teachers in a well mandated social distancing. As stated, institutions with experiences of planned online teaching design as part of their existing blended or open distant learning (ODL) experience, emergency remote teaching (ERT) was observed as a temporary shift of instructional delivery to an alternate mode due uncalled for crisis. Practicing through emergency remote learning environment necessitated transforming of topics (traditional lectures in F2F teaching) into a lesson plan mandated to continuing teaching in COVID crisis. A lesson plan is a teacher detailed description of the topic developed with instructional events for a lesson. Author together with other teaching faculty and support of senior management developed a strategical model using Gagne's nine instructional events to convert each topic into a lesson plan as part of institutional practice of continuing learning with minimal competency achieved by every learner. Current manuscript is an attempt to share this experience with global community facing the COVID-19 pandemic ordered with control movement in a locked down situation.*

Keywords: Emergency remote teaching, online teaching, Traditional lecture, Lesson plan, Instructional design, slef-directed learning, Personalised learning

1. Introduction

Learning and teaching disruption in an unprecedented challenges have created the opportunities for educators and instructional designers to work together to combine educational pedagogy and technology (e-tools) to enable continuing learning in an emergency remote teaching. However, educators with online teaching experience and instructional designers may agree to deliver curriculum as emergency remote teaching and rigorous online learning with a major difference in planning, implementation and outcome**.** Teachers in COVID crisis have additional responsibilities of researching and publishing beside, teaching and assessing in new normal practice of medical education. Innovation to creating alternative to clinical teaching in many ways have made it possible to engage students in a mandated social distancing globally. Keeping with patient, students and faculty safety, we must create thoughtful alternative teaching methods based on educational podgy and principle of assessment.

Well planned online learning experiences are meaningfully different with continuation of online courses offered with emergency remote teaching [1] during the crisis. Educators have never been as dependent on technology and being conversant with e-tools as they are now in a new normal of emergency remote teaching. Medical educators need innovative research and support of e-learning experts and instructional designers to propose solutions to continuing teaching in Coronavirus pandemic. The global outbreak of Coronavirus pandemic has nearly forced many institutions to abandon the F2F teaching with poor infrastructure in higher education [2, 3]. However, those with dynamic and vibrant teaching and learning environment of online experience have found it feasible to anticipate and transform F2F learning to ERT in a social distancing environment with a hybrid approach to curriculum delivery. A lesson plan is a way forward that provides a teacher detailed description of the topic developed with instructional events that may be chunked-in into small subtopics [4].

Lesson plan has become mandatory to create new vibrant methods of engaging students with a mix of synchronous and asynchronous teaching with or without supervision respectively while keeping in mind the constraints of online resources at faculty and students ends. Although current crisis has affected everyone, the good news is that teaching and learning communities have shown due resilience and tenacity in meeting the unprecedented challenges in medical education. Lesson plan created with appropriate educational principles based on authentic theories incorporating with e-learning tools familiarising the students and faculty followed by a well set teaching and assessing strategies online may be a practical solution. Instructional design of Gagne's nine instructional events [5] combined with Kolbs experiential learning cycle [6] and Gibb's reflective practice [7] are sound models that can be explored to create innovative learning experience in order to ensure minimal competency achieved by every single learner. Author with fellow faculty have used these pedagogies to create blended F2F and ERT model with successful experience evidenced with learners reflection. Student's engagement with self-directed learning

approach provided with self-assessment and continuing learning options was practiced with a lesson plan developed for each traditional lecture. Student centred-learning environment were ensured and practiced with hypothetico-deductive and speak aloud approaches [8] online in an emergency remote setting. Current learning experience is the continuum of innovative research practices [9, 10, 11, 12, 13] developed for emergency remote teaching complemented with some created and other curated learning materials observed with appropriate weighting and in keeping with principles of learning and assessment.

2. Methods and Strategies for Lesson Plan

2.1 Rational

Following were the rationale set for developing a lesson plan applied to a lecture (topic) in order to facilitate continuing teaching and learning experience in COVID crisis.

- To achieve minimal competency by every single students using online resources with F2F option (blended learning)in a concept forwarded by ILMU (Interactive Learning Material Unit) at IMU.
- To promote self- directed Learning (SDL) in a personalised learning environment provided on e-training portal of the institution.
- To provide topic for conventional F2F to online ERT with readily transferable to a planned online delivery in a continuing crisis of COVID-19 pandemic.
- To explore the learner's prior knowledge and skills in an integrated curriculum through curating and creating the leaning materials.

Technagogy (Pedagogy plus Technology):
Following theoretical models were found applicable to create lesson plan, which is defensible and credible with literature support.

- Gagne's nine instructional events with chunk-in strategies in a lesson plan (see figure 1 and appendix 1).
- Kolb's experiential learning cycle as contextualised learning experience (see figure 2 and appendix 1).
- Curated learning material provided on e-training portal as 20%-30% of a lesson plan provided with test of prior knowledge (see appendix 2).
- The rest of 70%-80% content of the lesson plan should be created (see appendix 2) for F2F learning with readily available for online delivery in an emergency remote teaching option.
- Implementation plan of emergency remote or online teaching and learning incorporated with appropriate e-tools.

Implementation Strategies
Prior to triggering and testing the relevant prior knowledge required for a lesson, an authentic teaching and learning method must have been selected with student and faculty training and familiarisation of that method. This could be a Task-based Learning, Team-based Learning (TBL) or Case-based Learning (CBL) for example. After revision of prior knowledge provided on e-training portal the entire large class is divided into 3 subgroups. Each group with its own Learning Outcome (LOs) to cover:

- **Subgroup 1.** Patient work up for differential diagnosis, demonstrating interviewing and physical examination skills.
- **Subgroup 2**. Patient work up for differential diagnosis demonstrating investigative and therapeutic skill.
- **Subgroup 3**. Epidemiology in global and country of practice (Malaysia) context.

Following strategy was adopted to allocate time for each subgroup preparation and presentation with interactive large group session choosing 90 minutes Task-based Learning method (author's current practice).

- 20 minutes assigned for within subgroup discussion (in online delivery this is done outside the class prior to session).
- 30 minutes divided into 10 minutes for each subgroup presentation.
- 20 minutes for entire group discussion interaction of members from all three subgroups.
- 10 minutes for debriefing by supervisor sharing his experience.
- 10 minutes for assessment using paper/pencil F2F test, Online Google Form test an individual readiness assurance test (IRAT), Online partial credit assessment using digital scratch-off (PCA-DS) for group readiness assurance test (GRAT) or Quizzes.

Assessment in Lesson Plan:
- Assessment of Prior knowledge as eLearning material should incorporate assessment as tests and quizzes.
- SEQ, assessment as learning using iLecture followed by 2-5 items test (30 minutes)
- OBA using IRAT/GRAT online created for PCA-DS for scoring and immediate feedback for 10 minutes (see figure 3).
- Self-assessment as incentives for continuing learning using virtual medical clinic (VMC) for 20 minutes as personalised option (see figure 3).

3. Result

Lesson plan applied to couple of lectures (topics) in surgical and allied discipline of ENT in clinical year four of undergraduate programme was developed using instructional design of Gagne's instructional model and routinely practiced and evaluated for its outcome (see table below).

4. Discussion

A lesson plan was observed as a teacher detailed description of the topic developed with instructional events for a lesson [4].Lesson plan was developed using Gagne's nine instructional event [5] and practiced as Kolb's experiential cycle [6] using Task-based Learning method. The data collected from teaching through a lesson plan was subsequently evaluated using learners reflective practice [7]. In execution of lesson plan in routine teaching and learning environment, reflective writing was made optional for learners who were interested in feedback. Inference was

drawn from students' perception of blended learning with prior reading and test and in-class activities. Students response though optional was good (see table 1). Learners generally appreciated the efforts for easy to retrieve learning materials as prior knowledge associated with self-assessment.

Learning outcome set for the session in general and for individuals working in three subgroups using task-based learning as method of teaching, learning outcome was achieved by all respondents. Prior reading and self-assessment to trigger prior knowledge required for the session was found helpful in preparation and monitoring of learning experience. About the feelings for lesson plan developed and delivered, all felt energised in otherwise frustrating situation of lacking in-person teaching and sharing of learning space. Regarding, how do the learners evaluate the lesson plan and its implementation using Task-based Learning method, session was found interactive with in-depth discussion of cognitive and problem solving skills that gave them more incentives for learning guided by key-features. However, subgroup discussion was found redundant since members have already prepared and discussed their part of session in advance. This was an important comment and in subsequent session time allotted for subgroup discussion of 20 minutes was allowed to have more time for inter-team discussions after the presentations of each group work. In analysis of session it was shown to be sufficient and a debriefing with sharing of supervisor personal experiences (preferably using videos and pictures) on clinical problem under discussion was requested with more time than what is currently allocated (10 minutes). In conclusion it was found a well-planned session. Ultimately in action plan students reflected to have more such sessions in order to identify their gaps in knowledge and skills relevant to lesson plan.

5. Conclusion

Medical education has been facing the unprecedented challenges of clinical teaching since the emergence of COVID-19 crisis early this year in 2020. A lesson plan developed as a teacher detailed description of the topic with its instructional events for a lesson was implemented and observed for its outcome. Author has developed a strategical model using Gagne's nine instructional events in which each topic was converted into a lesson plan as part of institutional practice of continuing learning with minimal competency achieved by every single learner. Learner's reflection in an emergency remote teaching using a well-developed lesson plan for knowledge and skills was found a useful method for self-directed and personalised learning approach to continuing clinical education during the COVID-19 crisis.

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Result Table: Qualitative analysis of reflective-writing responded by the learners in routine practice of lesson plan implemented with Task-based Learning method.

| No	Reflection Variables	Qualitative Analysis Result (Number Attendees = 61)				
		Varibles with Interpretation	No of Response	Agreed (%)	Not Responded	Disagree
1	Event	Lesson plan was a good effort	33 (55%)	28 (84.8%)	4 (12.12%) Only event mentioned	1 (3.03%) Too much reading
2	Feeling	Feeling satisfied after attending the session	33 (55%)	31 (93.9%)	2 (6.06%) Not explicit	0 (0%)
3	Evaluation	Interactive and engaging session	33 (55%)	29 (87.8%)	3 (9.09%) Not explicit	2 (6.06%) Dominated by few students
4	Analysis	Session sufficient for clinical learning online	33 (55%)	27 (81.8%)	3 (9.09%) Not explicit	3 (9.09%) Examination skills lacking
5	Conclusion	Learning outcome achieved	33 (55%)	30 (90.9%)	0 (0%)	3 (9.09%) wanted real patient
6	Action plan	More sessions on other clinical problems needed	33 (55%)	31 (93.9%)	2 (6.06%)	0 (0%)
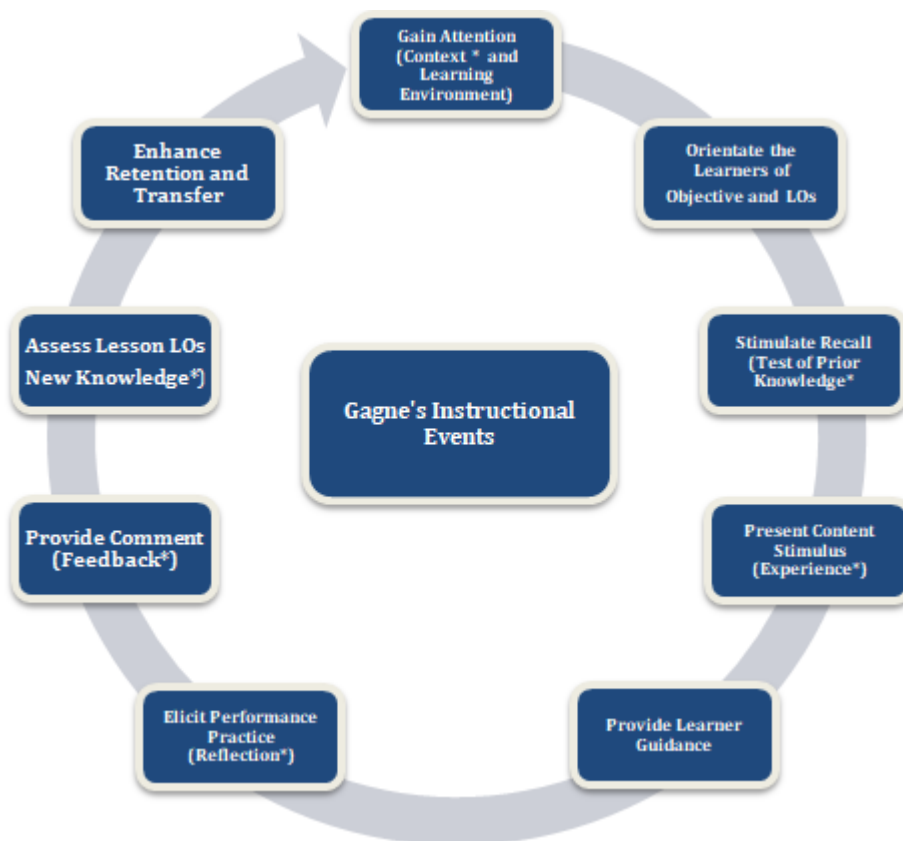
Figure 1: Lesson plan developed from Gagne's nine instructional events was also applied to Kolb's six steps experiential cycle (events indicated with an asterisk*).

Figure 2: Kolbs experimental learning cycle events shown with an asterisk embedded in Gagne's instructional model above was the other pedagogy used in developing lesson plan from a traditionally delivered topic.

Figure 3: Students' individual evaluation was basedon self-assessment as test of prior knowledge and IRAT, team-evaluation as GRAT and further self-evaluation using VMC case.

Appendix 1: Summary of Gagne's nine (9) events of instructional design adopted in lesson plan, page 1 and 2.

No	Gagne's Events	Application to Lesson Plan Using TBL Method
1	Gain Learner Attention (Introduction)	The main idea and theme of the TBL is provided to students together with likely differential diagnosis of a clinical case. However, a good knowledge of relevant anatomy, investigative skills and experience counts. Some exemplary pictures of the lesions are also provided for students develop a visual impact about the lesion.
2	Orientiate the Learners (Objective and Learning Outcome)	Objective (what teacher wants students' to do) and learning outcome (what students will be able to do to solve a clinical problem after attending the session)
3	Stimulate recall of prior learning (Test of prior knowledge)	Stimulate recall or prior knowledg by reviewing what have been taught in previous phases of training in curriculum relevant to the topic and procedures of clerking a patient in order to diagnose the case and suggest the outline of therapeutic management. Stimulus are provided with learning materials currated from the previous training and those created by the supervisor relevent to the theme. Only 20%-30% relevant to topic of the lesson are provided on e-training portal as e-learning component of the session. **Materials currated:** Materials currated are those from previous years of training provided with links created. **Links:** xxxxxxxxxxxx
		Material Created: Rest what cannot be retrieved and found essential for teaching session are the materials created with links provided. **A. Test of prior knowledge from Anatomy:** **Links:** xxxxxxxxxx **B. Test of prior knowledge from Clinical Skills:** Further resources were also created as found relevant to the topic of neck swellings with regards to clinical skills rquired for TBL. **Links:** xxxxxxxxxx
4	Present the stimulus (content as the clinical problem with chunking or scafolding)	**Authentic Case:** An authentic case of a lesion either found in the ward or retrieved from an online source by the students relevent to theur level of training. Content to be presented is made feasible with chunk-in or scafolding among the subgroup created in advance (by the academic office) with a leader.

No	Gagne's Events Resources/ Activities	Application to Lesson Plan of Neck Swelling as TBL Learning Resources and Learning Activities
5	Provide learning guidance (Strategies to learn from content and resources)	**Time Allocation:** The entire large class is divided into 3 subgroups. 20 minutes for each subgroup discussion + 30 minutes (10 minutes for each subgroup) TBL subgroup presentation + 20 minutes large group discussion + 10 minutes dbriefing + 10 minutes online assessment based on one baest answer (OBA) using digital scratch-off for partial credit (a digital device created by author named PCA-DS) for scoring and immediate feedback. **Objective and LOs:** LOs set each subgroup is provided to students through their respective subgroup leaders
6	Elicit student Performance (Application and practice)	Focus is paid, how to diagnose and manage the lesion. More emphasis is paid to discussion on differential diagnoses asking open ended questions by the supervisor about the criteria to diagnose the clinical case in context to learning given in event 4 of the Gagne's 9 instructions. Students are monitored and marked for their performance in group discussion
7	Provide Feedback (Timely feedback on student's performance	Immediate feedback is provided as a ebriefing on lesion in a 7-10 min talk contributed by the supervisor in which attention will be paid to what was correct and what was incorrect and have opportunities to improve for future undertaking of same or similar case encountered.
8	Assess Performance (To collect evisences of LO acievement)	Students' subgroup performance by the supervisor is assessed from their work and as they perform in face-to-face (F2F) discussion/online forum as a group and students' individual rating is provided by an online test based on 5-10 items OBA and/or 2-3 SEQ adminstered online). **Link Assessment:** xxxxxxxxxxx
9	Enhance Retention and Transfer (Opportunities created to connect course concepts to potential real world.	Learners are encouraged to undertake self-assessment using a virtual medical clinic (VMC) case 0f 20 minutes encounter. Supervisor can visit the link to monitor studnets interest in their lifelong learning incentives. **Link VMC Case:** xxxxxxxxxxxxx

Appendix 2: Learning resources and learning activities associated with a lesson plan implementation, page 1 and 2.

No	Resources/ Activities	Links to Learning Resources and Learning Activities
A	Learning Resources	**Essential reading:** Links to relevent reading materials (digital version/text books/online sent materials are provided with exact number of pages or chapters to be read. **Link:** xxxxxxxxxxxxx **Further reading:** Learning material or VORL and Videos demonstrating procedures and psychomotor skills for optional reading with links are also provided **1. Links for online reading:** xxxxxxxxxxxx **2. Links of VORL/ Videos created or selected from online resources:** xxxxxxxxxxxxxx
B	Learning Activities	**Outside Class Activity 1:** **Video Lecture on Anatomy: 1, 2 and 3 for example** Watch 3 interactive video lectures and click stop recording for a recommended time as indicated to respond several questions appearing at different intervals. Please do rate your performance agianst the marks allocated with each question to finally self-assess your prior knkwledge out of a total score = 50 for example required to attend current task-based learning (TBL) session using a self appraisal form. **Link to Self-appraisal 1 (Test of Prior Knowledge):** xxxx Assess your performance using the following rubric score: Unsatisfactory = <18 Borderline = 18-23/47 Satisfactory = 24-28/47 Good = 29-35/47 Excellent = >35 **Vdeo Demonstration of Neck Examination 1, 2, 5:** Watch each video demonstration on clinical examination of relevent theme. **Video Demonstration:** 1,2,3 for example Watch each video carefully to be able to explain and later demonstrate in a role play session with peer in clinical skills centre seeking a prior appointment

No	Resources/ Activities	Links to Learning Resources and Learning Activities
	Learning Activities (Continued.....)	**TBL Sub-group Preparation:** 1.Identify task assigned to your respective sub-group (check out from your group leader) and know the LOs relevant to your sub-group task and prepare accordingly prior to attending the TBL session **Inside Class Activity:** 1. Initial 20 minutes each sub-group to have final review of subgroup activity and decide who should present the task on behalf of the sub-group. 2. Each sub-group presentation by group representative 3. Actiively participate in inter-subgroup discussion with questions asked to other groups or respond to questions from other groups and/or make comments that may help in differential diagnose, provisional diagnosis and management of the clinical case chosen for TBL. This activity will be marked out of a toal 10 marks for each sub-group performance as under: 1. Unsatisfactory = <5 marks 2. Satisfactory = 5-7 marks 3. Excellent = >7 **Individual Formative Assessment:** Take on 5-10 OBA and/or 1-2 SEQ using the online link is provide. For OBA use the digital scratch-off for partial credit score (PCA-DS), which will give you a score in each item for a right answer, depending how many attempts did you make to find the right answer (see below). This will also provide you with an immediate feedback as you will know the right answer at the end of each item. 1. First attempt = 5 marks 2. Second attempt = 3 marks 3. Third attempt = 1 mark 4. Fourth attempt = 0 mark **Outside Class Activity 2:** **Self-appraisal 2 (Knowledge Transfer):** Log-in to e-training portal on VMC (clinical case mentioned) and start responding as per instructions provided to ultimately see your performance in dignosing and managing a clinical case. Watch through your grade.