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Learning Outcome 4.2

The three outcomes discussed here are from the set of learning outcomes presented in Assignment 4.1.

Outcome # 1: The students will recite and interpret key terminologies and definitions such as traffic demand, traffic flow, fundamental traffic flow equation, traffic density, travel time, peak hour factor, queue length and delay etc.

Two summative assessments to evaluate Outcome # 1: To evaluate student learnings of key topics, I plan to give in-class online quiz that involves match pairs where terminologies are in column A and definitions in column B. I also plan to include around 10% questions seeking understanding of definition in the final summative exam paper of the course. This will be a mix of subjective direct define question, True/False question, and multiple-choice question. The information that 10% of paper will contain important definitions will be conveyed to students, to encourage them to learn definitions of important terminologies. Additionally, as part of course content, a list of important terminologies to know, will be provided too. First summative assessment will be part of a low weightage in-class announced quiz before final summative exam. Thus, allowing students to self-assess their learning gap, and providing me an idea of which definitions are not yet clear or need to be revised quickly with help of online quiz evaluations.

The advantage of first in-class quiz is that it provides a clear document where the correct definitions are present in the document, however, because of its low weightage, students could miss the quiz or not attempt it. It also risks being too easy if not set up carefully. The second summative assessment that involves written summative end of exam, is good as it includes several different types of question. This assessment is also good as it is planned to make clear what is the syllabus. However, this assessment can be stressful in terms of memorizing terminologies along with other end of semester concept understanding, hence, it's important the formative assessments in class are used to allow students learn

these terminologies on the way. The final summative assessment should serve as simply a reminder to revise and not learning a completely new terminology for students.

Outcome # 2: The students will solve beginner-level problems by applying theoretical concepts and formulas learnt in the course and by referring the guidelines in the Highway Capacity Manual, Highway Safety Manual, and AASHTO Guidebook, etc. For example, determining level of service of an intersection, performing capacity analysis of an intersection or a roundabout, estimate stopping sight distance etc.

Summative assessment for this will be 1) an in-class online multiple-choice quiz and 2) an assignment after previous assessment, that includes solving few numerical word problems seeking design solutions to different word problems. For second assessment, the handouts needed (tables or section required as reference from manuals) will be provided. First assessment will be low-weight (~4%) and the difficult level will be low to medium. The second take home assignment and a week's time will be given, on which students can ask question on online forum. The weightage will be ~15% and the difficulty level overall will be medium to high. The students will be given 2 chances to turn a revised version at their own flexible timing with -5 penalty. The advantage of online assessment is that it provides students a low-risk platform to learn the right answers and self-assessment of their understanding of which manual and concept to be used for which type of design assessment. The questions will provide formulas. Low-medium level numerical word problems will be present. A chance to re-attempt it online later that day will be given at -5 grade. The disadvantage of this assessment might be that it might be too early for students to apply the concepts without giving much time to sink. Thus, it is necessary to solve few problems in-class and use effective prompts in-class to assess student understanding of these concepts. For second assessment, which is assignment based, has high weightage, the advantage is that it provides students with time to learn, think, and ask. However, if the problem is too hard it can discourage some

students, thus, it is imperative to let all students know that all students can solve these and there are two more chances.

Outcome # 3: The students will differentiate between different types of traffic signals used in the US such as protected only, permissive only, protected-permissive, etc.

For this outcome, one assessment will include an in-class group jigsaw activity that will need different group member to understand working of a type of traffic signal pre-assigned randomly – protected only, permissive only, protected-permissive etc. and need to identify a real world intersection of that type. An in-class session where students will educate other group members about the type of signal assigned. A discussion handout with discussion prompts will be provided. At the end of lecture, a simple-medium level multiple choice quiz will be used to assess their learnings. The advantage of this approach is it allows students to learn themselves and discuss along with enhancing a community feeling in the class environment. The disadvantage of this can be a student, who has difficulty in communicating complex concept in language, can hurt both the student and the group members. Hence, it is important to make available white board and marker and other communication tools along with allowing them to time to prepare by uploading discussion prompts few hours before the class. Other summative assessment for this will be in the final written exam problem solving question, where, student's will be asked to select either of 2 choices of signal type to time the signal intersection in the problem and discuss why do they think which one is better ? The advantage of this approach is it provides students with choice and their subjective opinion is sought; however, it is to be made clear to students that there is no one right answer and their reasoning for basis of choice is of importance. It is also important to develop this skill throughout course either through in-class similar problem solving or though assignment -based assessment. The grading for all the assignments will be absolute. By keeping the low-weight and low-medium level quiz performance and from final exam student feedback revisions will be made further on.