

**Table 3. Instructional Strategies, ICAP Examples and Recommendations for Implementation**

| Instructional Strategy                   | When to Use  | Impact on student learning outcomes (if any)   | Recommendations for Effective Implementation   |
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| Lecture (with or without demonstrations) | <p>For promoting comprehension of basic facts, concepts, principles, generalizations, viewpoints and arguments about a particular area of knowledge; may include the act of showing and explaining how something works and is performed (e.g. skill).</p> <p><b>In preparation for the following assessment methods:</b></p> <ol style="list-style-type: none"> <li>1. Multiple-Choice Question (MCQ)</li> <li>2. Concept map</li> <li>3. Quiz</li> <li>4. Exam</li> <li>5. Assignment/Report</li> <li>6. Two-Tier Multiple-Choice Question (TTMCQ)</li> </ol> | <p>Most of the studies in the literature involved comparisons of lectures in combination with other methods, and lack control groups.</p> <p>There is however, one notable experimental study by Deslauriers, Schelew and Wieman (2011), who divided 538 first-year undergraduate engineering students into two large lecture classes. The control group (n = 267) was taught by 3 hours of traditional lecture given by an experienced highly rated instructor. The experimental group (n = 271) was given 3 hours of instruction by a trained but inexperienced instructor - students were presented with a series of challenging clicker questions and were required to practice like physicist-like reasoning and problem solving during class time while being provided with frequent feedback. The experimental group had twice as much knowledge about electromagnetic waves based on test results.</p> | <p><b>When planning to teaching using a lecture:</b></p> <ul style="list-style-type: none"> <li>• Incorporate <b>ample</b> examples (verbal and visual) to illustrate, select examples that students can relate to, and draw examples from the class</li> <li>• Use <b>advance organizers</b> to set out connections and overviews, e.g. outlines, “questions to think about”</li> <li>• Works best when reinforced with other instructional strategies</li> </ul> <p><b>Developing higher order thinking skills:</b><br/>Make lectures interactive through <b>active learning driven activities</b> that require the students to <b>review</b> and <b>apply</b> their new learning, and <b>interact</b> with each other - buzz groups, think-pair-share, correct the error, jigsaw clusters.</p> <p><b>Applying ICAP Framework to teaching:</b><br/> <b>P:</b> Instructor delivers a presentation and students <b>listen without note-taking</b><br/> <b>A:</b> Instructor asks students to <b>highlight sentences</b> in the lecture notes that are considered to be important<br/> <b>C:</b> Instructor gets students to <b>pose questions</b> about what is unclear about the content taught<br/> <b>I:</b> Instructor gets students to <b>share their concept maps with peer/group</b> and <b>provide justifications</b> on why the concepts are interrelated</p> <p><b>Recommended resources:</b></p> <ol style="list-style-type: none"> <li>1. Deslauriers, L., Schelew, E., &amp; Wieman, C. (2011). Improved learning in a large-enrollment physics class. <i>science</i>, 332(6031), 862-864.</li> <li>2. Race, P., &amp; NetLibrary, Inc. (2007). <i>The lecturer's toolkit a practical guide to learning, teaching &amp; assessment</i>, London ; New York : Routledge (3rd ed.). London ; New York: Routledge. (See Chapter 3 on “Refreshing your lecture”; available as an eBook in SMU Libraries).</li> </ol> |
| Guest/Invited speaker                    | <p>For increasing student involvement by adding interest, bringing in new perspectives, experiences and communication styles, and providing expertise in specific content areas.</p> <p><b>In preparation for the following assessment methods:</b></p> <ol style="list-style-type: none"> <li>1. Concept map</li> <li>2. Quiz</li> <li>3. Exam</li> </ol>   | <p>There are limited studies which examined the impact of guest/invited speakers on students’ academic performance, but there is evidence of its effectiveness based on students’ perceptions.</p> <p>Riebe and colleagues (2013) examined the perceptions of 150 business undergraduate students on incorporating industry guest speakers into a leadership course. The results indicated that an appropriately briefed, qualified, interesting and engaging guest speaker plays an important role in active learning by exposing students to the</p>   | <p><b>When planning to teach using guest/invited speaker:</b></p> <ul style="list-style-type: none"> <li>• Encourage speaker to <b>teach</b>, rather than simply speak. Prepare a presentation brief for the speaker, containing key objective(s), anchor issues / questions, student demographic and if necessary, lesson/ assessment excerpts to provide context.</li> <li>• <b>Connect</b> what your speaker is saying to specific learning objectives from your lesson.</li> <li>• <b>Debrief</b> the students to maximize their learning. The more that you talk about what they had just learned the more that they will benefit from it.</li> </ul> <p><b>Developing higher order thinking skills:</b><br/>Before the session, invite students to research the background of the speaker and prepare a set of questions to ask the speaker that require higher order thinking. Require students to write a short <b>self-reflection</b> after the session. Record the session, if speaker is agreeable.</p>   |

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|                 | <p>4. Assignment/Report</p>   | <p>“real-world” of the workplace.</p>   | <p><b>Applying ICAP Framework to teaching:</b><br/> <b>P:</b> Instructor has students <b>listen to a presentation</b> by the guest/invited speaker<br/> <b>A:</b> Instructor gets students to <b>record verbatim notes</b><br/> <b>C:</b> Instructor gets students to <b>explain/paraphrase</b> the notes that they have recorded<br/> <b>I:</b> Instructor gets students to <b>discuss with peer/group</b> about the similarities and differences in the ideas shared by Guest/invited Speaker</p> <p><b>Recommended resource:</b></p> <ol style="list-style-type: none"> <li>Riebe, L., Sibson, R., Roepen, D., &amp; Meakins, K. (2013). Impact of industry guest speakers on business students' perceptions of employability skills development. <i>Industry and Higher Education</i>, 27(1), 55-66.</li> </ol>  |
| Spaced practice | <p>Spaced practice, students study in a way where practice is broken up into a number of short sessions – over a longer period of time, instead of massed or grouped together (equating total practice time). Spaced practice is also known as distributed practice or spaced repetition.</p> <p><b>In preparation for the following assessment methods:</b></p> <ol style="list-style-type: none"> <li>MCQ</li> <li>Quiz</li> <li>Exam</li> <li>TTMCQ</li> </ol> | <p>A notable study on spaced practice is the meta-analytic study by Donovan and colleagues (1999). They reported that individuals in spaced practice conditions performed significantly better than those in mass practice conditions, with an effect size of 0.46.</p> | <p><b>When planning for spaced practice:</b></p> <ul style="list-style-type: none"> <li><b>Precede</b> a spaced practice with clear demonstration and directions</li> <li><b>Review</b> a few of the most important concepts from a lecture at the end of each class or reviewing those concepts at the beginning of the next class</li> <li>Monitor students carefully and provide <b>feedback/correctives/reinforcements</b> promptly and when needed</li> </ul> <p><b>Developing higher order thinking skills:</b><br/> Build in multiple opportunities for formative practice (to <b>apply</b> what had been learnt) and follow-up feedback.</p> <p><b>Applying ICAP Framework to teaching:</b><br/> <b>P:</b> Instructor <b>plays a video</b> that explains Spaced Practice and why it works for students to watch<br/> <b>A:</b> Instructor requires students to <b>recall key facts, concepts or ideas</b> that were learnt earlier in the course, e.g. 1 week ago, 3 weeks ago<br/> <b>C:</b> Instructor asks students to <b>create their own concept maps</b><br/> <b>I:</b> Instructors get students to <b>collaborate with peer/group and explain to each other</b> the most important concepts that were learnt earlier in the course, and have them write their discussions down on a piece of blank paper</p> <p><b>Recommended resource:</b></p> <ol style="list-style-type: none"> <li>Dunlosky, J., Rawson, K., Gurung, Regan A. R., &amp; Landrum, R. Eric. (2015). Practice Tests, Spaced Practice, and Successive Relearning: Tips for Classroom Use and for Guiding Students' Learning. <i>Scholarship of Teaching and Learning in Psychology</i>, 1(1), 72-78.</li> <li>Donovan, J., Radosevich, D., &amp; Murphy, Kevin R. (1999). A Meta-Analytic Review of the Distribution of Practice Effect: Now You See It, Now You Don't. <i>Journal of Applied Psychology</i>, 84(5), 795-805.</li> </ol> |
| Guided inquiry  | <p>For involving students in finding and using a variety of sources of information to increase their understanding of a specific topic.</p>   | <p>Published studies on guided inquiry have compared it against other forms instruction, such as lectures or laboratory instructions, and are mainly in the science disciplines.</p>  | <p><b>When planning to teach using guided inquiry:</b></p> <ul style="list-style-type: none"> <li>Guide the questioning (see Socratic Questioning)</li> <li>Link content to issues, themes and problems</li> <li>Ensure <b>social interaction</b> between instructor-student, student-student</li> </ul>   |

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|                 | <p>Students conduct their own research and answer questions so as to develop new understandings of a topic.</p> <p><b>In preparation for the following assessment methods:</b></p> <ol style="list-style-type: none"> <li>1. Exam</li> <li>2. Student presentation</li> <li>3. Project</li> <li>4. Project with a client</li> </ol>                              | <p>In the study by Soltis and colleagues (2015), they compared the effectiveness of the Process-Oriented Guided Inquiry Learning (POGIL) strategy on enhancing students' problem-solving and critical-thinking skills with that of traditional lectures in a required course in the professional pharmacy program. The POGIL strategy begins with introducing students to a model, diagram, problem, or set of data and then requires them to work as a team to answer a series of questions leading to development of a concept or principle (guided inquiry).</p> <p>Overall mean examination scores increased significantly when POGIL was implemented. Performance on questions requiring higher-order thinking skills was significantly higher, when the POGIL strategy was used.</p> | <ul style="list-style-type: none"> <li>● Help students to make meaningful connections between the big ideas of a discipline and their personal experiences and prior knowledge and beliefs</li> </ul> <p><b>Developing higher order thinking skills:</b><br/>Ask students to offer evidence that the generalisation (i.e. <b>analyze</b>) they have come up with is suitable by citing relevant examples.</p> <p><b>Applying ICAP Framework to teaching:</b><br/> <b>P:</b> Instructor writes words that students know or that they may want to use to search for more information on the whiteboard as <b>students listen and pay attention</b><br/> <b>A:</b> Instructor gets students to <b>copy the words</b> he/she wrote on the whiteboard<br/> <b>C:</b> Instructor have students <b>decide on words</b> to use to search for more information, and <b>choose one to two relevant websites</b> based on search<br/> <b>I:</b> Instructors <b>work collaboratively with peer/group</b> to summarize their findings by coming up with a table or graph</p> <p><b>Recommended resources:</b></p> <ol style="list-style-type: none"> <li>1. Soltis, R., Verlinden, N., Kruger, N., Carroll, A., &amp; Trumbo, T. (2015). Process-oriented guided inquiry learning strategy enhances students' higher level thinking skills in a pharmaceutical sciences course. <i>American journal of pharmaceutical education</i>, 79(1), 11.</li> <li>2. Kuhlthau, C. C., Maniotes, L. K., &amp; Caspari, A. K. (2015). <i>Guided inquiry: Learning in the 21st century: Learning in the 21st century</i>. ABC-CLIO.</li> </ol> |
| Problem-solving | <p>For getting students to employ critical thinking skills in the analyses of problems and the synthesis and applications of previously learnt concepts.</p> <p><b>In preparation for the following assessment methods:</b></p> <ol style="list-style-type: none"> <li>1. Exam</li> <li>2. Case</li> <li>3. Project with a client</li> <li>4. Project</li> </ol> | <p>There is one experimental study by Klegeis and colleagues (2013) who examined the problem-solving abilities of 143 third-year biochemistry students. The experimental group were taught via the problem-based learning method, whereas the control group was taught via lectures with in-class activities. A statistically significant 13% increase in test scores of the experimental group was reported, while no trend towards significant change in scores were reported for the control group.</p>   | <p><b>When planning to teach using problem-solving:</b></p> <ul style="list-style-type: none"> <li>● Teach problem-solving skills in the specific <b>context</b> in which they will be used</li> <li>● Use <b>real-life</b> problems in explanations, examples, and exams</li> <li>● <b>Model</b> the problem-solving method for students so that they can apply it to a novel situation, e.g. asking questions at key moments</li> <li>● Have the students <b>work together in small groups</b> (3 to 5 students) to solve the problem and then have the solution presented to the rest of the class (either by you or by a student in the group)</li> </ul> <p><b>Developing higher order thinking skills:</b><br/>Ask students to <b>predict</b> "what would happen if ..." or explain why something happened so as to help them develop analytical and deductive thinking skills. InFor e.g., for large groups, get students to write reasonings for their proposed solutions.</p> <p><b>Applying ICAP Framework to teaching:</b><br/> <b>P:</b> Instructor gets students to <b>listen to his/her explanations</b> and <b>pay attention</b> to him/her write the solution steps on the whiteboard<br/> <b>A:</b> Instructor have students <b>copy down exactly the solution steps</b><br/> <b>C:</b> Instructor gets students to <b>justify/provide reasons the solution steps</b><br/> <b>I:</b> Instructor gets students to <b>discuss with peer/group</b> to provide an alternative solution</p>   |

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|                      |  |   | <p><b>Recommended resources:</b></p> <ol style="list-style-type: none"> <li>Klegeris, A., Bahniwal, M., &amp; Hurren, H. (2013). Improvement in generic problem-solving abilities of students by use of tutor-less problem-based learning in a large classroom setting. <i>CBE-Life Sciences Education</i>, 12(1), 73-79.</li> </ol>   |                      |  |                      |  |                  |  |
| Socratic questioning | <p>For promoting open discussion in which one viewpoint is compared to another through asking probing and thought-provoking questions in an effort to stimulate original thought from students.</p> <p><b>In preparation for the following assessment methods:</b></p> <ol style="list-style-type: none"> <li>Peer teaching</li> <li>Case</li> <li>Debate</li> </ol> | <p>There are several published studies that discuss that socratic questioning lead to improved critical thinking skills. Yang, Newby and Bill (2005) were able to demonstrate this via their pretest-posttest design study. Instructors taught and modeled Socratic questioning to undergraduate veterinary students. Students practiced these questioning techniques themselves through asynchronous discussion forums without the instructor's further facilitation. Their findings reported that students' critical thinking skills showed statistically significant improvement from the pre- to post tests after being taught and practiced Socratic questioning techniques.</p> | <p><b>When planning to teach using socratic questioning:</b></p> <ul style="list-style-type: none"> <li>Ask questions that are <b>exploratory, spontaneous</b> and <b>focused</b> in nature:</li> </ul> <table border="1"> <tr> <td>Exploratory question</td> <td> <ul style="list-style-type: none"> <li>Find out how much students know about an issue in discussion</li> <li>Use for introducing topic, review past discussions, recap of previous learning</li> <li>Typically asking "How" and "Why" questions</li> </ul> </td> </tr> <tr> <td>Spontaneous question</td> <td> <ul style="list-style-type: none"> <li>Probe students' thoughts so as to get them to examine their beliefs and assumptions</li> <li>Use when an important issue is raised or when discussion requires clarification</li> </ul> </td> </tr> <tr> <td>Focused question</td> <td> <ul style="list-style-type: none"> <li>Probe students to evaluate their thoughts and perspectives</li> <li>Use to narrow content to specific issues</li> </ul> </td> </tr> </table> <p><b>Developing higher order thinking skills:</b></p> <p>Ask more exploratory questions that are divergent in nature to create opportunities for students to exchange ideas and viewpoints, <b>evaluate</b> applications to problems, and <b>analyze</b> implications for real-life situations.</p> <p><b>Applying ICAP Framework to teaching:</b></p> <p><b>P:</b> Instructor have students <b>listen to a lecture</b> on Socratic questioning and the types of questions that students can ask</p> <p><b>A:</b> Instructor gets students to <b>make notes of his/lecture in a verbatim manner</b></p> <p><b>C:</b> Instructor ask <b>individual students to respond</b> to the his/her questions</p> <p><b>I:</b> Instructor gets students to <b>discuss with peer/group</b> about the individual responses, and come up with a common response</p> <p><b>Recommended resources:</b></p> <ol style="list-style-type: none"> <li>Barnes, B., &amp; Payette, P. (2017). Socratic Questioning. <i>National Teaching &amp; Learning Forum</i>, 26(6), 6-8.</li> <li>Yang, Y. T. C., Newby, T. J., &amp; Bill, R. L. (2005). Using Socratic questioning to promote critical thinking skills through asynchronous discussion forums in distance learning environments. <i>The American Journal of Distance Education</i>, 19(3), 163-181.</li> </ol> | Exploratory question | <ul style="list-style-type: none"> <li>Find out how much students know about an issue in discussion</li> <li>Use for introducing topic, review past discussions, recap of previous learning</li> <li>Typically asking "How" and "Why" questions</li> </ul> | Spontaneous question | <ul style="list-style-type: none"> <li>Probe students' thoughts so as to get them to examine their beliefs and assumptions</li> <li>Use when an important issue is raised or when discussion requires clarification</li> </ul> | Focused question | <ul style="list-style-type: none"> <li>Probe students to evaluate their thoughts and perspectives</li> <li>Use to narrow content to specific issues</li> </ul> |
| Exploratory question | <ul style="list-style-type: none"> <li>Find out how much students know about an issue in discussion</li> <li>Use for introducing topic, review past discussions, recap of previous learning</li> <li>Typically asking "How" and "Why" questions</li> </ul>   |   |  |                      |  |                      |  |                  |  |
| Spontaneous question | <ul style="list-style-type: none"> <li>Probe students' thoughts so as to get them to examine their beliefs and assumptions</li> <li>Use when an important issue is raised or when discussion requires clarification</li> </ul>   |   |  |                      |  |                      |  |                  |  |
| Focused question     | <ul style="list-style-type: none"> <li>Probe students to evaluate their thoughts and perspectives</li> <li>Use to narrow content to specific issues</li> </ul>   |   |  |                      |  |                      |  |                  |  |
| Games                | For creating a learning environment where  | Games are different from gamification, in which the latter involves introducing elements of gameplay in   | <p><b>When planning to teach using games:</b></p> <ul style="list-style-type: none"> <li><b>Prior</b> to introducing the game to students, create a <b>teaching guide</b> that demonstrates</li> </ul>   |                      |  |                      |  |                  |  |

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|                          | <p>game content and game play enhance knowledge and skills acquisition, and where game activities involve problem solving spaces and challenges that provide players/learners with a sense of achievement.</p> <p><b>In preparation for the following assessment methods:</b></p> <ol style="list-style-type: none"> <li>1. Concept map</li> <li>2. Assignment/Report</li> </ol>  | <p>non-game contexts. There are many published studies on games and gamification, but our review focused on games per se, as these are commonly used by SMU faculty in their teaching.</p> <p>The experimental study by Almeida (2012) examined the effect of an educational computer game for the achievement of factual and simple conceptual knowledge acquisition randomly assigned 65 undergraduate students majoring in education to the control and treatment groups. Each group had to read a script containing content about computer architecture. The control group read the script about the content then took the quiz. The treatment group read the same script, played the game, then took the quiz. The mean test score of the treatment group was significantly higher than that of the control group, suggesting that games could be used to assist achievement of classroom content.</p> | <p>how the game can be purposefully integrated as part of your teaching</p> <ul style="list-style-type: none"> <li>● Allow <b>time</b> for students to explore and do not intervene</li> <li>● Instead of <b>grading</b> gameplay, assess the learning transfer that you facilitate from the game experience to the curriculum</li> </ul> <p><b>Developing higher order thinking skills:</b><br/>Conduct <b>debrief</b> sessions after gameplay (in-class or out-of-class time) and facilitate the discussion using <b>socratic questioning</b> method. Ask questions that allow for connections being made between gameplay to course content. Get students to verbalize/write down their responses. Get them to reflect on how they can <b>apply</b> their learning from gameplay to novel situations.</p> <p><b>Applying ICAP Framework to teaching:</b><br/> <b>P:</b> Instructor let students <b>watch a video</b> on how the game is played<br/> <b>A:</b> Instructor <b>pause and go back to review</b> selected parts of the video<br/> <b>C:</b> Instructor create opportunities for students to <b>ask questions</b> about the game<br/> <b>I:</b> Instructor get students to <b>discuss with a peer/group</b> to come up with a strategy to play and win the game</p> <p><b>Recommended resources:</b></p> <ol style="list-style-type: none"> <li>1. Almeida, L. C. (2012). The effect of an educational computer game for the achievement of factual and simple conceptual knowledge acquisition. <i>Education Research International, 2012</i>.</li> <li>2. Dell'Aquila, E., Marocco, D., Ponticorvo, M., Ferdinando, A., Schembri, M., &amp; Miglino, O. (2017). <i>Educational Games for Soft-Skills Training in Digital Environments: New Perspectives</i>. , Place of publication not identified : Springer Science and Business Media : Springer (Advances in game-based learning). (Available as an eBook in SMU Libraries).</li> </ol> |
| Field trip/Study mission | <p>For creating out-of-school learning opportunities with exploration, discovery, first-hand and original experiences; collecting data for later analysis, to generate student work (e.g. report/presentation/reflection journal/blog) and stimulate discussions both on site and back at universities in tutorials, seminars and workshops.</p> <p><b>In preparation for the following assessment methods:</b></p> <ol style="list-style-type: none"> <li>1. Assignment/Report</li> <li>2. Reflection</li> </ol> | <p>Published studies on field trips/study missions were mainly in the elementary and secondary maths and science contexts which reported on students' perceptions.</p> <p>There is however, an experimental study by Amosa and colleagues (2015) who reported that secondary school students (n=25) who were taught practical applications of Basic Technology via a field trip performed significantly better on the test as compared to the control group (n = 25) who were taught the same concepts using the direct instruction method.</p>   | <p><b>When planning to incorporate field trip/study mission:</b></p> <ul style="list-style-type: none"> <li>● Become familiar with the setting before the trip</li> <li>● Orient students to the setting (via <b>pre-visit activities</b> such as videos, readings) and agenda and clarify learning objectives</li> <li>● Allow students time to explore and discover during the visit</li> <li>● Plan activities that support the curriculum and also take advantage of the uniqueness of the setting</li> <li>● Plan and conduct <b>post-visit classroom activities</b> to reinforce the school field trip experience and to allow students opportunities for sharing and feedback</li> </ul> <p><b>Developing higher order thinking skills:</b><br/>Require students to write a <b>self-reflection report</b> after the field trip/study mission to deduce connections between learning gained to the curriculum, and to articulate how to <b>apply</b> (transfer) what has been learnt to another novel situation</p> <p><b>Applying ICAP Framework to teaching:</b></p>   |

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|             | journal/log/paper   |   | <p><b>P:</b> Instructor gets students to <b>listen to a lecture</b> about the site of visit; <b>watch a video</b> that provides an orientation of the site of visit</p> <p><b>A:</b> Instructor asks students to <b>make verbatim notes</b> about the site of visit from the lecture/video</p> <p><b>C:</b> Instructor has <b>students ask questions</b> during the Field Trip/Study Mission</p> <p><b>I:</b> Instructor <b>pairs students up to share and exchange</b> reflections about the Field Trip/Study Mission</p> <p><b>Recommended resource:</b></p> <ol style="list-style-type: none"> <li>Amosa, A. G. A., Ogunlade, O. O., &amp; Atobatele, A. S. (2015). Effect of Field Trip on Students' Academic Performance in Basic Technology in Ilorin Metropolis, Nigeria. <i>Malaysian Online Journal of Educational Technology</i>, 3(2), 1-6.</li> </ol>  |
| Case method | <p>For engaging students in the problem-solving process of a real-world professional practice situation.</p> <p><b>In preparation for the following assessment methods:</b></p> <ol style="list-style-type: none"> <li>Exam</li> <li>Assignment/Report</li> <li>Case</li> <li>Student presentation</li> </ol> | <p>There is an experimental study published by Yoo and Park (2014) who examined the effect of case-based learning on problem solving abilities of 190 graduate nurses. They reported that the experimental group (n=94) which was taught using cases performed significantly higher on the simulated test that measured problem-solving abilities, as compared to the control group (n=96) that were taught using traditional lectures.</p> | <p><b>When planning to teach using cases:</b></p> <ul style="list-style-type: none"> <li>For the first few cases, provide some <b>scaffold</b> on how to approach a case. <ul style="list-style-type: none"> <li>What is the issue?</li> <li>What is the goal of the analysis?</li> <li>What is the context of the problem?</li> <li>What key facts should be considered?</li> <li>What alternatives are available to the decision-maker?</li> <li>What would you recommend — and why?</li> </ul> </li> </ul> <p><b>Developing higher order thinking skills:</b></p> <p>Feature <b>real-life</b> situations in your cases, with <b>detailed</b> quantitative and qualitative data. Require students to develop a solution to an <b>open-ended</b> problem with multiple potential solutions. Requirements can range from a one-paragraph answer to a fully developed group action plan, proposal or decision.</p> <p><b>Applying ICAP Framework to teaching:</b></p> <p><b>P:</b> Instructor has students <b>pay attention</b> and <b>listen</b> to his/her explanations about the case reading</p> <p><b>A:</b> Instructors gets students to <b>highlight selected text</b> thought to be important in the case reading</p> <p><b>C:</b> Instructor gets students to <b>justify or provide reasons</b> for their proposed point of view</p> <p><b>I:</b> Instructors gets students to <b>build up on peers' contributions</b> during the case discussion</p> <p><b>Recommended resources:</b></p> <ol style="list-style-type: none"> <li>Schiano, W., &amp; Anderson, E. (2014). <i>Teaching with Cases : A Practical Guide</i> , Boston, Massachusetts : <i>Harvard Business Review Press</i>. (<u>Available as a lending copy in LKS Library Level 4 HD30.4 .S329 2014</u>)</li> <li>Yoo, M. S., &amp; Park, J. H. (2014). Effect of case-based learning on the development of graduate nurses' problem-solving ability. <i>Nurse Education Today</i>, 34(1), 47-51.</li> </ol> |
| Discussion  | For encouraging active student  | There are limited experimental studies on the impact  | <b>When planning to teach using discussion:</b>  |

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|        | <p>participation to practice and sharpen the ability to articulate and defend positions, consider different points of view, and enlist and evaluate evidence.</p> <p><b>In preparation for the following assessment methods:</b></p> <ol style="list-style-type: none"> <li>1. Case</li> <li>2. Project with a client</li> <li>3. Project</li> </ol> | <p>of discussion on student academic performance. An old study by Garside (1996) did find that communication students who were taught using group discussions performed significantly better on questions testing higher-order thinking as compared to those who were taught using traditional lectures.</p>   | <ul style="list-style-type: none"> <li>● Set <b>ground rules</b> and expectations (e.g. remaining non-judgmental, and paraphrasing earlier speaker).</li> <li>● <b>Plan</b> whether discussion is to be guided / unguided. Think about whether students have the necessary <b>prior knowledge</b>. How will you handle silent students or conflict situations?</li> <li>● Use wait time of <b>3-5 seconds</b> or more, particularly when higher-order questions are asked.</li> <li>● Bring <b>closure</b> to synthesize the central issues covered, key questions raised.</li> </ul> <p><b>Developing higher order thinking skills:</b><br/>Use questions that require more complex thinking, and plan ahead for closing summary / synthesis:</p> <ol style="list-style-type: none"> <li>1. Questions that <b>ask for more evidence</b>, clarification and which are open-ended</li> <li>2. Questions that <b>link</b> or extend the discussion</li> <li>3. Questions that pose <b>hypotheticals</b></li> <li>4. Questions that provoke students to explore <b>cause &amp; effect</b> linkages</li> <li>5. Questions that invite students to summarize or <b>synthesize</b></li> </ol> <p><b>Applying ICAP Framework to teaching:</b><br/> <b>P:</b> Instructor introduces the topic of discussion while students <b>listen attentively</b><br/> <b>A:</b> Instructor makes students <b>record verbatim notes</b> about the topic of discussion<br/> <b>C:</b> Instructor gets students to <b>explain/elaborate on one's contribution</b><br/> <b>I:</b> Instructor gets students to <b>build up on peers' contributions</b></p> <p><b>Recommended resources:</b></p> <ol style="list-style-type: none"> <li>1. Galanes, G., Adams, K., &amp; Brillhart, J. (2007). <i>Effective Group Discussion : Theory and Practice</i> , Boston : McGraw-Hill. (<u>Available as a lending copy in the LKS Library Level 3 HM736 .B75 2007</u>)</li> <li>2. Garside, C. (1996). Look who's talking: A comparison of lecture and group discussion teaching strategies in developing critical thinking skills. <i>Communication Education</i>, 45(3), 212-227.</li> </ol> |
| Debate | <p>For requiring students to discuss, organize and put forth their points of view for one side of an argument on a topic.</p> <p><b>In preparation for the following assessment method:</b></p> <ol style="list-style-type: none"> <li>1. Debate</li> </ol>  | <p>Published studies on teaching with debates were mainly for social sciences and law courses. There is limited evidence based on comparisons between control and treatment groups for this instructional strategy though there is one such study in political science that compared debates and lectures:</p> <p>Omelicheva and Avdeyeva (2008) reported that undergraduate political science students in the experimental group acquired better comprehension, application and critical evaluation skills based on their test scores when a controversial topic was taught via debates, as compared to it being taught</p> | <p><b>When planning for debates:</b></p> <ul style="list-style-type: none"> <li>● Prepare guidelines and a set of rules to assist students as they prepare for the debate, e.g. non-debate students to be adjudicators to help them learn how to be objective in rating their peers' performance.</li> <li>● Hold a practice debate to help students understand the process.</li> <li>● Prepare rating <b>rubrics</b> and distribute to adjudicators before the debate begins.</li> <li>● Facilitate classroom discussion and debrief the process at the end of the debate.</li> </ul> <p><b>Develop higher order thinking skills:</b><br/>Get students to debate on controversial, news- breaking and stimulating topics to encourage dynamic and energized classroom discussion. Students are more likely to be <b>authentic</b> when they debate a subject to which they can relate.</p>  |

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|                              |   | <p>using lectures.</p>  | <p><b>Applying ICAP Framework to teaching:</b><br/> <b>P:</b> Instructor provides guidelines about the format for the debate and gets students to <b>listen and pay attention</b><br/> <b>A:</b> Instructors asks students to <b>make verbatim notes</b> about the debate format<br/> <b>C:</b> Instructor asks students to <b>justify their own stand</b><br/> <b>I:</b> Instructor has students <b>challenge peers’ position/criticize one another’s stand</b> by asking for justifications</p> <p><b>Recommended resource:</b></p> <ol style="list-style-type: none"> <li>1. Omelicheva, M., &amp; Avdeyeva, O. (2008). Teaching with Lecture or Debate? Testing the Effectiveness of Traditional versus Active Learning Methods of Instruction. <i>PS: Political Science &amp; Politics</i>, 41(3), 603-607.</li> </ol>   |
| <p>Project with a client</p> | <p>For involving students in design, problem solving, decision making, and/or investigative activities. These activities are typically undertaken by students operating with varying degrees of autonomy over extended periods of time, and mentored by the instructor and client. The project generally culminates in deliverables to the client, in the form of a written report, physical artifacts (e.g. prototype), and/or oral presentation.</p> <p><b>In preparation for the following assessment methods:</b></p> <ol style="list-style-type: none"> <li>1. Assignment/Report</li> <li>2. Student presentation</li> <li>3. Self assessment/evaluation</li> <li>4. Peer assessment/evaluation</li> <li>5. Project with a client</li> </ol> | <p>There is limited published evidence which shows that projects with clients lead to significant improvements in academic performance.</p> <p>Nonetheless, a recent study by Akpan (2016) showed that undergraduate students who undertook consulting projects with clients developed essential career-related competencies (e.g. <b>problem-solving, communication, leadership</b>) at the end of the projects.</p> | <p><b>When planning for projects with clients:</b></p> <ul style="list-style-type: none"> <li>● Guide students on setting <b>realistic expectations</b> of how their current skills and experiences match up with the requirements of the project, which may not be so structured and have greater ambiguity as compared to typical classroom setting.</li> <li>● Ensure <b>active coaching and supervision</b> of the written report preparations and rehearsing of student oral presentations prior to their delivery to a client audience.</li> <li>● <b>Mediate</b> between the students and the project client in terms of the project goals and deliverables.</li> <li>● Provide constant <b>feedback</b> to students so that they can make continuous progress towards completing the project deliverables within the stipulated timeline.</li> </ul> <p><b>Develop higher order thinking skills:</b><br/> The process of having students coming up with practical and implementation solutions to real world projects of the clients is itself getting students to develop higher order thinking skills such as <b>critical thinking and problem-solving</b>.</p> <p><b>Applying ICAP Framework to teaching:</b><br/> <b>P:</b> Instructor provides guidelines about the timeline and deliverables for the project with client as students <b>listen attentively</b><br/> <b>A:</b> Instructors asks students to <b>make verbatim notes</b> about the guidelines<br/> <b>C:</b> Instructor asks students to <b>write an analysis paper individually</b> about their research findings<br/> <b>I:</b> Instructor has students <b>compare their research findings with one another</b></p> <p><b>Recommended resources:</b></p> <ol style="list-style-type: none"> <li>1. Akpan, I. J. (2016). The efficacy of consulting practicum in enhancing students’ readiness for professional career in management information systems: An empirical analysis. <i>Decision Sciences Journal of Innovative Education</i>, 14(4), 412-440.</li> <li>2. Problem-Based And Project-Based Learning Approaches: Applying Knowledge To Authentic Situations. (2009). The SAGE Handbook of Management Learning, Education and Development. <u>(Available as an eBook in SMU Libraries; see Chapter 18 on “Problem-Based and Project-Based Learning Approaches: Applying Knowledge to</u></li> </ol> |

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|           |  |  | <u>Authentic Situations.”)</u>  |
| Project   | <p>For involving student, or group of students, working under the guidance and direction of the instructor. It involves planning and developing a schedule of study and outcomes to be achieved over a period of time usually longer than that of an individual assignment. The students are not required to only produce a single outcome, but are required to link multiple, and often distantly related disciplinary and interdisciplinary concepts.</p> <p><b>In preparation for the following assessment methods:</b></p> <ol style="list-style-type: none"> <li>1. Assignment/Report</li> <li>2. Student presentation</li> <li>3. Self assessment/evaluation</li> <li>4. Peer assessment/evaluation</li> <li>5. Project with a client</li> </ol> | <p>There is evidence to show that projects has an impact on exam performance, such as the study by Iwamoto and colleagues (2016) who reported that first-year undergraduate psychology students in the experimental group scored significantly higher on the MCQ exam as compared to the control group.</p>  | <p><b>When planning for projects:</b></p> <ul style="list-style-type: none"> <li>● Guide students on setting <b>realistic expectations</b> of how their current skills and experiences match up with the requirements of the project, which may not be so structured and have greater ambiguity as compared to typical classroom setting.</li> <li>● Ensure <b>active coaching and supervision</b> of the written report preparations and rehearsing of student oral presentations.</li> <li>● Provide constant <b>feedback</b> to students so that they can make continuous progress towards completing the project deliverables within the stipulated timeline.</li> </ul> <p><b>Develop higher order thinking skills:</b><br/>The process of having students coming up with solutions to authentic projects is itself getting students to develop higher order thinking skills such as <b>critical thinking and problem-solving</b>.</p> <p><b>Applying ICAP Framework to teaching:</b><br/> <b>P:</b> Instructor provides guidelines about the timeline and deliverables for the project as students <b>listen attentively</b><br/> <b>A:</b> Instructors asks students to <b>make verbatim notes</b> about the guidelines<br/> <b>C:</b> Instructor asks students to <b>write an analysis paper individually</b> about their research findings<br/> <b>I:</b> Instructor has students <b>compare their research findings with one another</b></p> <p><b>Recommended resources:</b></p> <ol style="list-style-type: none"> <li>1. Alam, M., &amp; Gühl, U. (2016). <i>Project-management in practice : A guideline and toolbox for successful projects , Berlin, Germany : Springer</i>. Berlin, Germany: Springer. (<u>Available as an eBook in the SMU Libraries</u>).</li> <li>2. Iwamoto, D. H., Hargis, J., &amp; Vuong, K. (2016). The effect of project-based learning on student performance: An action research study. <i>International Journal for Scholarship of Technology Enhanced Learning</i>, 1(1), 24-42.</li> </ol> |
| Role-play | <p>For students to act out the role of a character in a particular situation following a set of rules (interactive), or presentation is made by a student who has adopted a particular character (non-interactive) so as to provide insights into working life.</p> <p><b>In preparation for the following assessment methods:</b></p> <ol style="list-style-type: none"> <li>1. Peer teaching</li> <li>2. Reflection journal/log/paper</li> </ol>   | <p>Published studies on role play were found in various disciplines such as healthcare, business, psychology, economics and literature. These studies mainly reported students’ perceptions on how role play can lead to them developing relevant work-ready skills such as leadership and empathy. For example, Westrup and Planander (2013) conducted a role-play activity where 84 undergraduate students had to solve a human resource management issue and use their theoretical knowledge from the course in this field. Students’ responses collected via the minute paper after the role-play activity were positive. Students reported that the role-playing activity supported the students in getting insights into a</p> | <p><b>When planning for role-play:</b></p> <ul style="list-style-type: none"> <li>● Before the role-play <ul style="list-style-type: none"> <li>○ Give an introduction what the role-play consists and its aim</li> <li>○ prepare students by giving them a brief and sufficient time to read</li> </ul> </li> <li>● Bring <b>closure</b> through a debrief after the session</li> <li>● Ensure there <b>feedback</b> is collected from students, and given to students, after the role-play</li> </ul> <p><b>Develop higher order thinking skills:</b><br/>Feature <b>real-life</b> situations as part of the role-play activity. Require students to <b>reflect</b> on how they <b>construct</b> a collective understanding based on the differing interpretations and perspectives of their peers regarding the issue brought up via the role-play activity.</p> <p><b>Applying ICAP Framework to teaching:</b></p>  |

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|                             | <p>3. Self assessment/evaluation</p> <p>4. Peer assessment/evaluation</p>   | <p>complex leadership situation by stimulating change of perspectives, a collective understanding, and a sense of community.</p>  | <p><b>P:</b> Instructor <b>gives instructions</b> to students about the format of the role-play<br/> <b>A:</b> Instructor gets students to <b>copy word-for-word</b>, some of the more important instructions<br/> <b>C:</b> Instructor gets students to <b>infer new knowledge</b> through the role-play activity<br/> <b>I:</b> Instructor gets students to <b>work in pairs/group</b> to role-play a given situation and <b>dialoguing</b> about the experience</p> <p><b>Recommended resources:</b></p> <ol style="list-style-type: none"> <li>Howieson, J., &amp; Rogers, S. (2017). Using the role-play at the lectern: Developing “work-ready” and confident professionals. <i>The Law Teacher</i>, 1-11.</li> <li>Westrup, Ulrika, &amp; Planander, Agneta. (2013). Role-play as a pedagogical method to prepare students for practice: The students’ voice. <i>Högre Utbildning</i>, 3(3), 199-220.</li> </ol>   |
| <p>Student presentation</p> | <p>For students working together to share verbally on a topic to an audience. The instructor typically probes and questions students during the presentation so as to assess their ability to reason critically in areas that cannot be assessed by written exam, e.g. oral communication skills, conciseness, persuasiveness, quality and clarity of responses to questions, body language and professional manner.</p> <p><b>In preparation for the following assessment methods:</b></p> <ol style="list-style-type: none"> <li>Student presentation</li> <li>Self assessment/evaluation</li> <li>Peer assessment/evaluation</li> <li>Project with a client</li> </ol> | <p>DeGrez and colleagues (2014) reported that observational learning<sup>a</sup> and providing students with opportunities to practice the application of the assessment criteria to their own presentations led to statistically significant increase in scores on the assessment criteria from the first to the third presentation.</p> <p><i><sup>a</sup>In supporting observational learning, short video clips illustrating behaviors in relation to the criteria that students will be assessed using were incorporated into a multimedia instructional package about the do’s and don’ts of oral presentation.</i></p> | <p><b>When planning for student presentations:</b></p> <ul style="list-style-type: none"> <li>Set expectations about the <b>do’s and don’ts</b> of oral presentation</li> <li>Explain the <b>assessment criteria</b></li> <li>Allow <b>practice</b> opportunities,, give <b>feedback</b> on presentations (from instructor and/or peers)</li> </ul> <p><b>Develop higher order thinking skills:</b><br/> Constantly prompt students through open-ended questions to <b>elaborate</b> on their ideas during the presentation. Get them to <b>evaluate</b> one another’s presentations and give <b>feedback</b> based on given criteria.</p> <p><b>Applying ICAP Framework to teaching:</b><br/> <b>P:</b> Instructor gets students to <b>watch an instructional video</b> on the “do’s” and “don’ts” of delivering an effective oral presentation<br/> <b>A:</b> Instructor gets students to <b>copy word for word</b>, the “do’s” and “don’ts”<br/> <b>C:</b> Instructor asks students to <b>compare and contrast</b> the different ways of delivering an effective oral presentation<br/> <b>I:</b> Instructor <b>pairs students up</b> to critique each other’s recorded oral presentation</p> <p><b>Recommended resources:</b></p> <ol style="list-style-type: none"> <li>Degrez, L., Valcke, M., &amp; Roozen, I. (2014). The differential impact of observational learning and practice-based learning on the development of oral presentation skills in higher education. <i>HIGHER EDUCATION RESEARCH &amp; DEVELOPMENT</i>, HIGHER EDUCATION RESEARCH &amp; DEVELOPMENT, 2014.</li> <li>Kerby, D., &amp; Romine, J. (2009). Develop Oral Presentation Skills Through Accounting Curriculum Design and Course-Embedded Assessment. <i>Journal of Education for Business</i>, 85(3), 172-179.</li> <li>McCarthy, P., &amp; Hatcher, Caroline. (2002). <i>Presentation Skills: The Essential Guide for Students</i>. London: SAGE Publications.</li> </ol> |
| <p>Self-practice</p>        | <p>For students to engage in self-directed independent</p>  | <p><i>There is currently no experimental study published in the literature that has a significant impact on student</i></p>   | <p><b>When planning for self-practice:</b></p> <ul style="list-style-type: none"> <li>Consider using <b>group / class level feedback</b> (highlighting common errors, give examples</li> </ul>  |

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|  | <p>learning, typically assisted by well-developed self-paced learning resources.</p> <p><b>In preparation for the following assessment methods:</b></p> <ol style="list-style-type: none"> <li>1. MCQ</li> <li>2. Quiz</li> <li>3. Exam</li> <li>4. TTMCQ</li> </ol> | <p><i>learning outcomes.</i></p> | <p>or models of target performance, show students what you do not want)</p> <ul style="list-style-type: none"> <li>● Consider implementing <b>peer feedback</b></li> <li>● Require students to specify <b>how they used feedback</b> in subsequent works</li> </ul> <p><b>Developing higher order thinking skills:</b><br/>Use explicit learning objectives and assessment rubrics to guide students' practice. Build in multiple opportunities for formative practice and follow-up feedback.</p> <p><b>Applying ICAP Framework to teaching:</b></p> <p><b>P:</b> Instructor <b>gives instructions</b> on how to complete the self-practice exercise while students <b>listen attentively</b></p> <p><b>A:</b> Instructor have <b>students ask questions</b> to clarify on the self-practice exercise that is unclear to them</p> <p><b>C:</b> Instructor gets students to <b>explain or elaborate</b> on how they arrive at the answers</p> <p><b>I:</b> Instructor <b>pairs students up</b> and have them mark each other's self-practice exercise and have students <b>revise errors based on peer feedback</b></p> <p><b>Recommended resource:</b></p> <ol style="list-style-type: none"> <li>1. Dunlosky, J., Rawson, K., Gurung, Regan A. R., &amp; Landrum, R. Eric. (2015). Practice Tests, Spaced Practice, and Successive Relearning: Tips for Classroom Use and for Guiding Students' Learning. <i>Scholarship of Teaching and Learning in Psychology</i>, 1(1), 72-78.</li> </ol> |
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