

CTE Annual Assessment Report Template

The purpose of CTE program-level assessment at PCC is to look at student achievement of degree and certificate-level outcomes and to help faculty focus on how to improve student learning based on assessment.

Please choose **one** of the degree and/or certificate outcomes that was part of this year's Summary Data Report, and provide a more in-depth explanation of your assessment process, results and how this might be used to enhance teaching and learning.

This form to be used for both assessments (first time the outcome is assessed) and for re-assessments (a follow-up for the initial assessment of the same outcome).

On completing the form, please e-mail it to learningassessment@pcc.edu.

SAC Assessment Contact(s):

| <i>Name</i> | <i>e-mail</i> |
|-------------|--------------------|
| Joe Gordon | joe.gordon@pcc.edu |

1. Which SAC do you represent?

Geography

2. Which outcome is reported here? (Please provide the text of the outcome, and the degrees/certificates to which it applies).

Use geographic concepts and GIS technologies to input, store, query, and retrieve spatial and attribute data. (PC)

3. Please share **how** this outcome was assessed to help us understand your process for assessment. Please attach a rubric, sample score sheet, or other assessment tool.

The outcome was assessed using a multiple choice skills test compiled from training material from Esri ArcGIS Desktop Entry Technical Certification exams. The assessment was administered at the end of spring term in classes with GIS prerequisites (i.e., GEO 266, 267, 270). Students enroll in multiple GIS classes simultaneously, and duplicates were removed from results.

As related to the stated outcome, ArcGIS is the technology around which PCC's GIS curriculum is centered, and it is a complex suite of tools designed for the input, storage, querying, and retrieval of spatial and attribute data. In order to effectively use it, however, the GIS practitioner must be familiar with geographic concepts and problem solving in a spatial manner. In other words, questions that seemingly reference only software minutiae (i.e., what button to push or tool to use) also inherently involve assessing a problem or workflow from a spatial point of view and understanding the correct sequence of steps.

4. Please include information about your benchmark (the score that indicates successful attainment of the outcome), and how it was determined.

Out of 25 questions, 20 was considered to be satisfactory (e.g., an A or B grade). Unfortunately, the software company and publisher of the certification exams (Esri) does not transparently communicate a scoring methodology or an explicit determination of what constitutes a passing grade on a certification exam.

Our benchmark of 80% correct responses was determined based on an anecdotal understanding of what is expected in order to acquire and succeed in an entry level position in the competitive professional GIS field.

5. Please provide data collected in the assessment of this outcome (including score distribution and percent of students meeting benchmark). Summarize your findings in the box below. Attach supplemental information or appendices. For this report, **please do not include student identifying information**, but you can assign an arbitrary identifier, especially if you wish to reference individual scores in your discussion.

13% (3 students) achieved an A, 61% (14 students) achieved a B, 17% (4 students) achieved a C, and 8% (2 students) achieved less than a C. 74% (14 students) achieved the minimum benchmark of 80% (or 20 out of 25 questions correct).

6. Please discuss your overall findings regarding student learning. (What did you learn from this assessment? Were there any surprises? Do the data make sense? How do the data relate to student learning?)

We learned that students do well on questions related to common workflows, and not as well on questions related to uncommon or less-used workflows. Obviously, this is not unusual or surprising, and it reaffirms that we are providing an entry-level understanding of a very broad field.

That said, when looking at questions that received correct responses from less than 80% of the students, the largest area of confusion tended to be coordinate systems (e.g., the types of tools dedicated to different systems). Frankly, this can be a tough topic for professional GIS persons as well, since it is not uncommon for a job to necessitate only working in the coordinate system of the agency's territory.

Another general trend was confusion on topics that may have only been extensively covered in non-required or elective GIS classes, which not all students will take (e.g., web mapping, cartography). This suggests perhaps limiting the scope of questions to only those types of software skills that we would assume students to know having taken the required GIS classes.

7. Please reflect on the entire project and share how your CTE SAC will use the results to improve student mastery of this outcome. Are there changes that need to be made to improve teaching and/or learning?

It's difficult to determine the best use of the results, given that any Esri-specific ArcGIS exam will largely measure the recall of button-pushing workflows of a massive software package. I've worked in the industry in private, government, and academic roles for 10+ years, and find myself googling the correct workflow or method all the time. There is no way (or purpose) to memorizing every nook and cranny of the software.

That said, there were a few questions that had significant incorrect responses, including questions 3, 12, and 20, which are:

3. *Which tool from the Tools toolbar should be used to view the user-specified buffer distance for a polygon feature class created using the Buffer geoprocessing tool?*
12. *Which two options return a location from latitude and longitude coordinates? (Choose two.)*
20. *An ArcGIS user has been tasked with creating a feature class of sidewalk centerlines in an existing geodatabase. The sidewalk feature class must use the same spatial reference as the data in the organization. How should the Create Feature Class geoprocessing tool be used to get the correct spatial reference?*

All three of these questions are fairly idiosyncratic or subject specific. The way forward is to either accept that a one-year GIS certificate is not designed to capture these methodological edge cases (and conversely cater the assessment to more common workflows), or to provide more room in the lab curriculum to repeated uses of these somewhat infrequent workflows.

8. What changes do you plan to make to your assessment of this outcome in the future?

I'd recommend replacing questions 3 and 12 with more general questions, and perhaps inserting additional lab work toward the workflow alluded to in question 20. Question 3 is somewhat confusing in that the second-most selected answer can theoretically be envisioned as the first step toward figuring out the correct answer. Question 12 is frankly a bit of an idiosyncratic edge case.

This way of thinking may be a way forward for the future skills tests in the GIS Certificate Program. What are the questions that focus on workflows that a majority of GIS professionals will use regardless of their specific topical or geographic specialties? For example, a GIS professional can work for either a county-level taxation office identifying the legal boundaries of properties, or a federal agency measuring the demographic spatial distributions of a nation. We should be assessing the skills that will most likely apply to both.

Has the outcome been assessed before? (If not, skip this question).

9. Were any modifications to instruction implemented between the prior assessment and this one? How did the assessment methods and results compare with the prior assessment?

To help us understand your SAC's overall processes, please complete these additional questions.

1. Was the SAC able to include Part-Time (PT) and Full-Time (FT) faculty for this assessment? If PT faculty did not participate, please explain any barriers that might account for this fact.

Full and part-time faculty were both used in the assessment process. The bulk of the in-class assessment work and subsequent analysis was performed by part-time faculty, but some administrative and planning work was facilitated by full-time faculty.

3. Is there anything else you would like to share with us? Please let us know.

Not particularly, beyond the aforementioned conceptual difficulties with knowing how to effectively assess (in a timely and robust and useful fashion) the ability to use ArcGIS software to solve real world problems. This discussion will surely continue within our SAC as we research and experiment with and refine our assessment methods.

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Thank you for completing this report!

We hope this has been a useful project to help your CTE SAC assist your students!