

USING CMAPTOOLS FOR ASSESSMENT MAPPING AND PLANNING

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Abstract. In higher education, administrators and faculty are increasingly being asked to demonstrate the relationship of program learning outcomes with course learning outcomes and successful implementation and assessment. Although this process is implicitly part of academic process, campuses are being asked to demonstrate this process by the Higher Learning Commission (HLC). HLC requires demonstrating connections among goals and objectives at the level of the college, the department, specific programs within departments and specific courses. This paper will focus on the lowest two levels of this mapping process, between the program goals and the individual courses offered in the psychology major. Previous research on concept maps and experience with CmapTools has suggested that creating concept maps in this process might be useful in facilitating communication among faculty members about the program learning goals, and facilitating mapping of course learning goals to program learning goals. In addition CmapTools will allow linking from concept maps to documents and web pages associated with assessment planning, course syllabi and learning objectives, and student assignments demonstrating specific learning objectives.

1 Introduction

The primary goal of this project was to assist the Psychology program (part of the Counseling, Psychology and Social Work department) at Chadron State College to develop procedures and resources that would enable them to prepare for the Higher Learning Commission accreditation visit. The Higher Learning Commission (http://www.ncahlc.org/index.php?option=com_frontpage&Itemid=113) requires alignment of goals and objectives at all levels within the institution. The particular focus in this project is the relationship between the Psychology Program Level Goals and the learning objectives and goals within particular classes required to complete an academic major in the field of psychology. The use of concept maps in student assessment has been addressed in many educational forums (Ruiz-Primo, Schultz & Shavelson., 1997) , and concept maps have been found to be beneficial in encouraging students to engage in meaningful thinking and learning (Novak, 1998; Novak & Gowin, 1984). Concept maps have also been used by teachers as guides to curriculum development, at levels ranging from a course (e.g., Clark & James, 2004), to a complete educational program (Edmondson, 1993; Gerchak, Besterfield-Sacre, Shuman & Wolfe, 2003; McDaniel, Roth, & Miller, 2005) The ability of concept maps to address standards and learning goals at a multitude of levels, and the power of current concept mapping tools such as CmapTools (Cañas et al, 2004) to integrate the development at various levels make it a natural choice in addressing the needs of institutions addressing assessment issues. In addition, the functionality of concept mapping tools in enabling collaboration among faculty in group brainstorming sessions and asynchronous collaboration on concept map and project development make it a unique tool to allow professors to collaborate as time allows.

An initial step in this process was to reach consensus on learning goals for the psychology. As department goals and objectives shifted, this goals and objectives also changed. Historically the psychology program offered two areas of emphasis, in Substance Abuse and General Psychology. In many cases, traditional psychology curriculum was not emphasized, due to interests of students and faculty, the existence of a masters degree counseling program within the same department, and the ability for students to achieve state certification as CADAC (Certified Drug/Alcohol Counselor) by taking specified courses at the undergraduate level. Department faculty responded by adopting the learning goals and objectives proposed by a Task Force of the Education Directorate of the American Psychological Association (<http://www.apa.org/ed/pcue/taskforcereport2.pdf>). In this document there are ten general learning goals, associated with more specific learning outcomes. The first five goals are specific to psychology, and the remaining five goals are applicable to many fields of study. The American Psychological Association has also developed an information guide about the best practice in assessing outcomes for these learning goals.

Because the Higher Learning Commission requires an integration of program learning goals, and those involved in specific courses, a final stage in the process will be to map out the learning goals for the individual courses. The program must demonstrate adequate presentation and assessment of these goals, potentially at both the course and the program level. Concept mapping tools will allow the attachment of resources to individual course maps, which may consist of syllabi, or of activities or assignments utilized in communicating learning goals. The development of these course maps may serve as useful resources for new or adjunct faculty, and will potentially serve as sharable department resources. Such a project is obviously a time-consuming departmental endeavor, and will require

cooperation and collaboration of all faculty members. Thus the current project should be regarded as an initial step in the process, with initial focus on integration of learning goals and objectives, and potential development of materials for one or two courses.

2 Procedure

The process used in the project is a top-down approach. Department members will begin with mapping the learning goals proposed by the American Psychological Association for undergraduate psychology programs. This effort will include

- create overall map of general learning goals from APA that the Psychology Program has adopted with potential links to specific classes indicated
- map out each of the ten learning goals and associated specific learning objectives in ten separate maps (with possible submaps for more specific learning goals)
- create a cmap for each course, indicating how the course is offered, and specific course learning objectives, based on faculty input and syllabus analysis. Since the learning objectives have been only recently added to syllabi, textbook analysis and faculty input will also be required.
- create resource links to assessments of specific learning outcomes, including assignments, and potentially electronic versions of student submissions demonstrating mastery of learning goals and objective
- Create resource links for potential activities and assignments that faculty might use to achieve specific learning objectives – these might represent a pool of resources that would be accessible to faculty, though they might not represent assignments that have actually been used.

It is expected that this project will involve collaboration of faculty members and adjuncts in the department. There will be numerous methods of collecting information from faculty. Faculty are required to submit copies of their course syllabi, and these will be used to collect information about learning goals and outcomes in the individual classes. Faculty will be asked to provide more specific information about the projects and activities they use to address specific learning goals, in terms of both teaching and assessment. While ideally all faculty might be involved in concept map construction and creating resources for the concept maps, in practice, this may be difficult to do given faculty schedules. It is anticipated that the project will be shared in departmental meetings and with administrators to facilitate understanding of the project and to promote participation.

3 Preliminary Results

At the current point in the project, nearly all of the learning goals have been mapped out with specific learning objectives, and preliminary course mappings made. Initial maps for each course have been started with primary attention to maps in which the learning goals are partially determined by connection to the college's General Studies program (e.g., Psychology 421 Culture and Psychology). Collection of learning objectives for specific courses is in progress. From this initial analysis, it was apparent that many learning goals would be addressed across courses, and that linking at the top level would provide only an overview. In addition, linking at the lower levels of specific learning objectives and courses would provide a more detailed analysis which is likely to be more useful for assessment purposes.

Only a portion of the project will be presented in this paper and the associated presentation. Interested parties may visit the project at IHMC Public Cmaps, 1cscpsychmaps. Concept maps at several levels will be presented, with the intent of demonstrating the depth of the project, and the potential of CmapTools for this endeavor. Figure 1 shows the initial map of APA Learning Goals. In this concept map, only the overall learning goals are presented. Goals specific to psychology include Goals 1 – 5, and Goals that may be considered to apply generally to higher education are Goals 6 – 10. Preliminary course mappings of learning goals to courses are also depicted. It should be noted that several of the goals apply across courses, particularly when considering the knowledge base of psychology, and the general education learning goals regarding communication skills and information literacy.

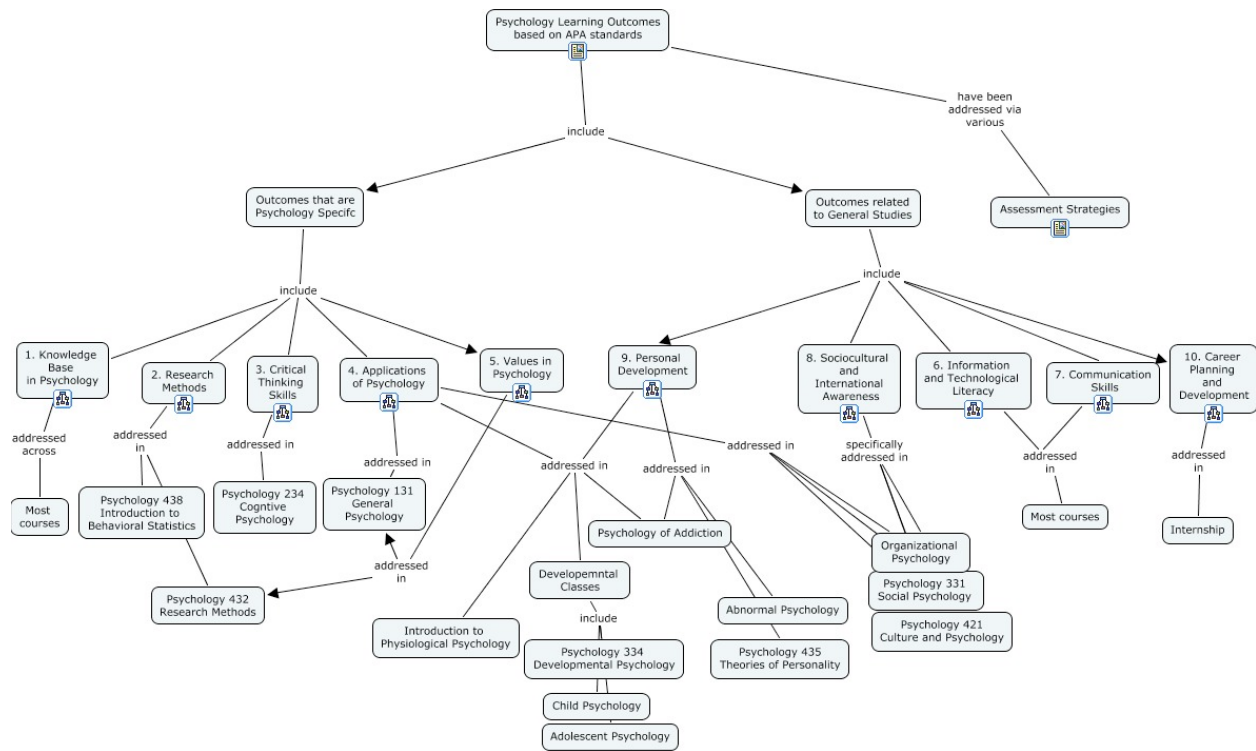


Figure 1. Preliminary Overall Map of Learning Goals and Course Connections.

The connections between individual classes and the learning goals are relatively straightforward. For example, Learning Goal 2 is mostly specifically addressed in the classes on research methods and statistics. Learning Goal 2 has six specific learning objectives, which in turn have further subdivisions. The multi-layered aspects of the learning goals and objectives suggests that mapping at both the overall course level, and at the level of individual units within a course may be useful.

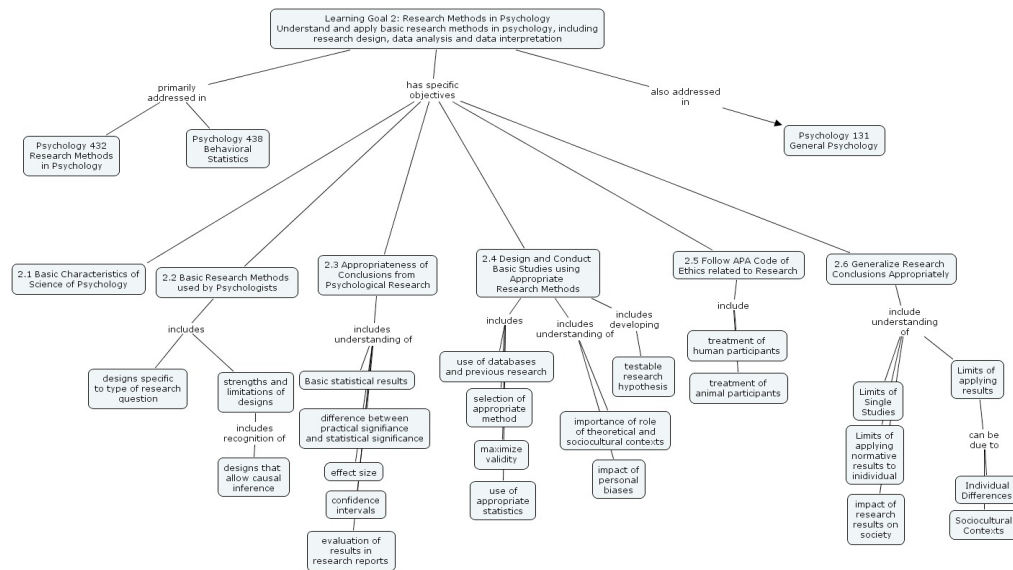


Figure 2. An Example of a Concept Map for a Specific Learning Goal.

Matches and mismatches between learning goals, objectives and outcomes can be considered at a programmatic level, and at the level of an individual course. The match between objectives such as Learning Goal 2 and the research methods and statistics courses occurs at a relatively high programmatic level. Within the course, connections between learning outcomes and course assignments should also be possible, indicating a match between course assignments and learning objectives. In a research methods class, an example of an assignment that addresses Learning Goal 2, and also information literacy goals, might include searching a library database such as Psycinfo to find information relevant to a research topic, and evaluating the results and discussion sections of the articles obtained to determine if appropriate statistics were used and appropriate conclusions made.

Another example of a match that can be made at the programmatic level is between the Culture and Psychology class and Goal 8, Sociocultural and International Awareness. The class was developed to also meet general studies learning objectives. In the past, in some cases the class had been taught from the viewpoint of multiculturalism, particularly as applied to multicultural counseling. This is another case where mapping of objectives had led to a better understanding of mismatches and matches with APA learning goals.

One issue that has been addressed by the department across several catalog changes has been the inclusion of specialized substance abuse classes and counseling classes as part of the undergraduate psychology program. Although many of these classes have been dropped from more recent catalogs, mapping of them indicates only minimal matching to the learning goals of psychology, primarily a special instance of applications of psychology, with minimal inclusion of goals related to multiculturalism and personal development. This mismatch indicates a need to re-assess the role of the courses in the undergraduate psychology program.

4 Summary

This article reports on a project in process. In this project, program learning goals for psychology will be developed in concept maps. In addition, concept maps consisting of the learning goals for individual courses within the program will be developed, and an examination of the integration between program and course learning goals will be considered. As a final step, resources will be developed for individual courses demonstrating instruction and assessment of specific learning goals. It is expected that the project will improve department understanding of and involvement in the assessment process, and that developed course maps will be useful resources for departmental faculty.

5 Referentes

- Cañas, A. J., Hill, G., Carff, R., Suri, N., Lott, J., Eskridge, T., et al. (2004). CmapTools: A Knowledge Modeling and Sharing Environment. In A. J. Cañas, J. D. Novak & F. M. González (Eds.), *Concept Maps: Theory, Methodology, Technology. Proceedings of the First International Conference on Concept Mapping* (Vol. I, pp. 125-133). Pamplona, Spain: Universidad Pública de Navarra.
- Clark, I & James, P. (2004) Using concept maps to plan an introductory structural geology course, *Journal of Geoscience Education*, 52(3), 224-230.
- Edmondson, K. M. (1993). *Concept mapping for the development of medical curricula*. Paper presented at the Annual Conference of the American Educational Research Association, Atlanta, GA. (Eric Document Reproduction Services No. ED 360 322)
- Gerchak, J., Besterfield-Sacre, M, Shuman, L. & Wolfe, H. (2003) Using concept maps for evaluating program objectives. Presented at 33rd ASEE/IEE Frontiers in Education Conference, Nov 5-8, 2003 Boulder, CO.
- McDaniel, E. Roth, B., & Millar, M. (2005) Concept mapping as a tool for curriculum design, *Issues in Informing Science and Information Technology Education Joint Conference*, 505-513, Flagstaff, AZ, June 16-19, 2005
- Novak, J. D. (1998). *Learning, creating, and using knowledge: Concept Maps as Facilitative Tools in Schools and Corporations*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Novak, J. D., & Gowin, D. B. (1984). *Learning How to Learn*. New York: Cambridge University Press.
- Ruiz-Primo, M. A., Schultz, S. E., Shavelson, R. J. (1997). *Concept map-based assessment in science: Two exploratory studies*. Los Angeles, CA. CRESST.