

## Faculty Specific Publications

### AgriSciences

Articles / opinion pieces about teaching for the Faculty of AgriSciences

**Acker, D.G. 1999. "Improving the Quality of Higher Education in Agriculture Globally in the 21st Century: Constraints and Opportunities." *Journal of International Agricultural and Extension Education* (Summer 1999).**

**Abstract:** Agricultural knowledge systems play a central role in developing and disseminating knowledge, information and technologies relevant to improving global food security and environmental sustainability. Formal agricultural education is one component of agricultural knowledge systems. This article argues that current agricultural education systems are in need of fundamental reform to support improvements in global food security and environmental sustainability. Constraints and opportunities are presented relative to improving the quality of higher education in agriculture globally. Challenges discussed are the lack of global cooperation, the limited frame of reference associated with educational nationalism, underutilized sources of knowledge, the need for globalization of educational content, gender imbalances among students and faculty members, narrow disciplinary approaches used in organizing learning, and the narrow definition of scholarship and its impact on recognition systems at institutions engaged in higher education in agriculture. Advances in communication technology coupled with a rebirth of global cooperation make it possible to achieve significant advances in higher education in agriculture.

**Acuna, B. T., Able, A. J. "Academic, industry and students perspective on the "inclusion of vocational knowledge" in a 'learning and teaching academic standards statement' for agriculture. *Journal of Learning Design* 7 (2) 1-15.**

**Abstract:** This paper reports on the perspective of industry stakeholders in a national project to develop a Learning and Teaching Academic Standards (LTAS) Statement for the Agriculture discipline. The AgLTAS Statement will be aligned with the Science LTAS Statement published in 2011 and comprise a discourse on the nature and extent of the Agriculture discipline and a set of Threshold Learning Outcome (TLO) statements specific to Agriculture. Agricultural research and teaching relies on strong links with industry due to the applied nature of the discipline. Without these links, sustainable and profitable practice change in agricultural systems cannot be achieved. A pilot project, in 2011-2012, with academic staff from three Australian universities identified vocational knowledge as a potential focus for a TLO. The AgLTAS project provides the opportunity to validate or refute this TLO by seeking input from a wider group of stakeholders, including industry. National consensus is being sought by a process of iterative consultation with academics, students and industry stakeholders and tested across four Australian universities. We have collected qualitative and quantitative data from industry participants who attended a series of workshops across most Australian States and Territories and through an online survey. Surprisingly, and contrary to the findings of the pilot project, industry representatives considered vocational knowledge of lesser importance to the need for students to attain highly developed problem solving and communication skills that can generate new

opportunities and innovation in agriculture. Industry specific (vocational) knowledge was generally regarded as attainable during on-the-job training after graduation. This finding prompts the question whether the AgLTAS Statement should be linked to professional accreditation that may be attained after graduation.

**Belay, K. 2008. "Linkage of Higher Education with Agricultural Research, Extension and Development in Ethiopia." *Higher Education Policy* 21: 275–299.**

**Abstract:** High-level agricultural manpower training in Ethiopian institutions of higher education (AIHE) specializing in agriculture and related fields was studied. The study reveals that high-level agricultural manpower training began in the early 1950s and that, at present, the country has seven institutions of higher learning, which train students in agriculture and related fields. The results of the study show that the AIHE have contributed to the agricultural sector through training high level agricultural professionals, enhancement of indigenous research capability, and generation and dissemination of technologies. The study also reveals that a host of factors have put a stranglehold on the training process and the professional competence of agricultural graduates. Moreover, the results shed new light on the programmes of study, which were found to be unable to respond to the labour market requirements and current rural realities due to lack of relevance of the curricula, which are no longer able to produce graduates who could deal with the wider problems of rural development.

**Cano, J. and S. Metzger (1995). "The Relationship between Learning Styles and Levels of Cognition of Instruction of Horticulture Teachers." *Journal of Agricultural Education* 36 (7).**

**Abstract:** The flexibility for learners to learn begins with the teacher's style of learning and the levels of cognition utilized in the classroom. Teachers have the basic capability to learn and teach; however, they are not all able to learn and teach effectively in the same exact way. The current study sought to determine the learning style and cognitive level of instruction of central Ohio horticulture teachers. The Florida Taxonomy of Cognitive Behaviors (FTCB) and the Group Embedded Figures Test (GEFT) were used to assess the level of cognitive instruction (FTCB) and the learning style (GEFT). The results indicated that 44% of the teachers preferred the field dependent learning style and 56% preferred the field-independent learning style. Furthermore, 84% of the teaching occurred at the lower levels of cognition. The mean weighted cognitive score for the teachers was 23.03. The mean weighted score reflected a cognitive level of teaching concentrated near the cognitive level of translation. A moderate positive ( $r=.32$ ) relationship was found between learning style and the weighted cognitive level of instruction. Correlation coefficients between GEFT scores and the seven levels of cognition ranged from a substantial negative association ( $r=-.53$ ) to a moderate positive association ( $r=.41$ ).

**Cerny-Koenig, T., C. A. Perillo, et al. (2007). "Piloting a Program-level Learning Assessment Plan in Plant and Soil Science." *NACTA Journal*: 26-33.**

**Abstract:** Faculty of Washington State University's undergraduate degree programs in Crop Science, Soil Science, and Horticulture initiated the development and implementation of an assessment process to gauge the extent to which WSU students in the plant and soil science programs meet university and program learning goals. This process was undertaken primarily to help improve our joint teaching efforts and students' learning; it also was encouraged by the needed documentation for the 2007 university accreditation and a need to better match our program learning goals with the University's newly developed Learning Goals of the Baccalaureate. The new program-level assessment plan focused on determining and documenting student progress and proficiency at the sophomore and

senior levels. This paper describes the development process and results of the initial assessment cycle and how faculty from three degree programs were recruited and trained in the assessment of student research posters in the sophomore level course and oral presentations on soil-plant management plans in the senior level course. Average faculty ratings were 2.8 for the sophomore projects and 4.5 for the senior projects out of a possible 6 points across all rubric dimensions, with inter-rater reliability of 89 and 87%, respectively. Increased scores at the senior level suggest that student proficiency does increase as students progress through our curriculum and can be documented by rubrics of comparable evaluation criteria.

**Dahlgran, R. A. (1990). "Teaching Innovations in Agricultural Economics: An Economic Approach." *American Journal of Agricultural Economics* 72 (4): 873-882.**

**Abstract:** An economic learning model, with time inputs of instructional preparations, classroom contact, and student preparation under both innovative and traditional teaching methods, is developed and used to evaluate teaching innovations in agricultural economics. The model's implications for evaluating teaching innovations are developed and tested. The conclusions are as follows: a comparison of test scores for experimental and control groups to evaluate teaching innovations ignores the efficiency impacts of "labour-saving" innovations; students can provide useful data for evaluating teaching innovations; and economic cost-benefit concepts should guide conclusions about the effectiveness of innovations.

**Dissanayeke, U. & Wickramasuriya, H. 2010. "E- Learning in Agriculture Higher Education: A Case Study." *Journal of Emerging Trends in Educational Research and Policy Studies* 1 (2): 80-83.**

**Abstract:** E-learning strategies are increasingly being using in the higher education sector to facilitate the teaching - learning process. The Faculty of Agriculture, University of Peradeniya recently established a Learning Support Centre (LSC), to which teachers can upload e-learning modules (ELMs) so that students would have free access to course related additional learning resources. During the time of this study, the LSC offered e-learning materials for 13 courses. The study was conducted to find out the (i) level of use of ELMs, (ii) undergraduates' attitudes towards e-learning, and (iii) limitations and challenges in using e-learning. Sixty one undergraduates were selected for the study using stratified random sampling method. A structured self-administered questionnaire was used in data collection. Focused group discussions were also conducted with staff members to collect information. Frequency distributions, chi-square tests, and Spearman's correlations analysis were used to explain the variables. Use of computers and the internet for academic work is fairly common among the undergraduates. About 95% of the respondents found to be using web for academic purposes at least once a week. Students who frequently use the internet for academic purposes had higher GPAs indicating higher academic performances ( $r=0.266$ ,  $p < 0.05$ ) and had favorable attitudes towards e-learning ( $r=0.301$ ,  $p =0.018$ ). Many (69%) students were seen using the LSC recommended for the ongoing academic semester. Average number of e-learning modules used by a student was limited to 3 although an average student has visited 5 such modules available in the LSC. The major challenges for introducing e-learning in the Faculty were seen as lack of advanced computer skills among the academic staff, less awareness on instructional design techniques, time constraints, and security concerns. Hence, it is important to provide the necessary technical assistance to interesting academic staff members to develop good quality e-learning resources.

**Esler, K. Downsborough, D. J. et al. 2016. "Interdisciplinary and multi-institutional higher learning: reflecting on a South African case study investigating complex and dynamic environmental challenges." *Current Opinion in Environmental Sustainability* 19:76–86.**

**Abstract:** Complex social-ecological problems need sustained interdisciplinary engagements across multiple disciplines, yet academic offerings continue to reflect disciplinary silos. To address this, a five-year program, within a developing country context, was conceived to follow an interdisciplinary research mode using a team of students and supervisors from various institutions across the disciplines of ecology, hydrology and economics. By using a flexible student training model, regional/ site specific knowledge was developed while simultaneously developing a shared vision and a model to combine information from each student project. Graduates felt enabled by the program that actively encouraged interdisciplinary interactions and engagements while simultaneously furthering disciplinary development. Cross disciplinary communication, was achieved through multiple engagement opportunities and common research outputs, all facilitated by an external boundary organization. While lengthy time frames are required for such collaborative interdisciplinary programs, researchers, higher learning institutions and funding agencies should not avoid this type of program and investment.

**Estepp, C. M., Strippling, C. T. et al. 2013. "An Examination of the Learning Activities, Cognitive Level of Instruction, and Teacher Immediacy Behaviors of Successful Instructors in a College of Agriculture." *Journal of Agricultural Education* 54 (2) 15 –28.**

**Abstract:** The National Research Council (NRC) has indicated that effective instruction in colleges of agriculture should prepare students to enter a dynamically changing workplace by helping students learn to be proficient in 21st century skills. The NRC suggested that effective instruction in colleges of agriculture should encompass a hospitable learning environment that includes a variety of learning activities that reach higher levels of cognition. The purpose of this study was to observe instructors in a college of agriculture who have been deemed successful and examine their teaching behaviors. This study investigated the learning activities used by these instructors, the cognitive level of instruction, and the teaching immediacy behaviors employed. Results revealed that these successful instructors use lecture a majority of the time; however, they also employ a variety of learning activities, such as cooperative learning, discussion, questioning, and individualized application. Additionally, these instructors teach mostly at lower cognitive levels, except when using cooperative learning. Furthermore, results showed that these successful instructors exhibit a moderate number of positive teaching immediacy behaviors.

**Falk, C. L., P. Pao, et al. (2005). "Teaching Diversified Organic Crop Production Using the Community Supported Agriculture Farming System Model." *Journal for Natural Resources in Life Sciences Education* 34: 8-12.**

**Abstract:** An organic garden operated as a community supported agriculture (CSA) venture on the New Mexico State University (NMSU) main campus was begun in January 2002. Students enroll in an organic vegetable production class during spring and fall semesters to help manage and work on the project. The CSA model of farming involves the sale of shares to members who receive weekly assortments of the farm's output. This is the first organic garden on the NMSU main campus, the first organic vegetable production class, and the first CSA venture in southern New Mexico. This article focuses on the main class activities, how the class has evolved, and future challenges. In particular, the article explores how the class operates within the context of a functioning organic CSA farm with teaching, research, and extension objectives that sometimes are in conflict.

**Fielke, S.J & Bardsley, D.K. 2014. "The importance of farmer education in South Australia." Land Use Policy 39: 301–312.**

**Abstract:** There is a significant challenge involved with balancing food security at local and global levels whilst mitigating the environmental and social consequences of the historically productivist agri-food system. This work will address the importance of education in the South Australian agricultural sector as a tool to maximize beneficial outcomes. The results of a blended method research project, which involved farmers and governance stakeholders in South Australia, are presented as empirical evidence highlighting the positive roles that formal education, in particular university education, have in regard to increasing sustainability. It was found that higher levels of formal education contributed to farmers being more likely to prioritize the socio-environmental outcomes of their agricultural land use. There was also dramatic reduction in farmer concerns with government support mechanisms as education levels went from secondary or less, through to vocational qualifications, and finally university degrees. Interviews with agricultural governance stakeholders emphasized the role of education in building the adaptive capacity of farmers, and the subsequent positive outcomes for the future development of the South Australian agricultural industry. These results suggest that further education provides farmers with the capacity to compete effectively in a liberalized economy.

**Igo, C., D. M. Moore, et al. (2008). The Problem-Solving Approach (Techniques January 2008).**

**Abstract:** No abstract

**Langford, Kenneth Victor. 2007. Developing A More Effective Agricultural Graduate. A Curriculum Conceptual Framework. Unpublished doctoral dissertation. Sydney: University of Western Sydney.**

**Abstract:** This thesis focuses overtly, on developing undergraduate curricula both generally and specifically in agriculture and related fields and covertly, on an appeal to raise the status, quality and products of undergraduate education. A closer examination is made of the relationship between the structure, function and purpose of tertiary education, the immediate and long-term professional needs of the undergraduate student and the current and future requirements of the communities in which graduates will study, lead, live, learn and work. It is my contention that the reality and challenge of the undergraduate student's on and off-campus community experiences should be the catalyst, motivation and transformational cauldron for their professional and personal development and that their curriculum should be designed, delivered, assessed and reported to reflect this individual development. I argue that currently this is not the case and consequently students graduating from more traditionally designed and delivered courses are less prepared for a changing and changeable world. Primary and secondary research evidence presented supports this position. A universal remedial model, schema or conceptual framework emerging from the assimilation of primary and secondary research, is presented and substantially explained. The schema is so designed that a wide variety of core curricula could be developed based on context, need and circumstance. The intricate design of the schema as a "mandala" was inspired by a creative fusing of ancient western, ancient eastern and modern philosophies however, a wide range of essential underpinning 'developmental', 'educational' and 'learning' theories are integrated into its structure and function. The "Twilight Curriculum", a unique component of the schema was inspired by theories relating to the "Hidden Curriculum" and "Self Determined Learning". It focuses on the development of wisdom through interest and needs-based action research / action learning projects. Wisdom in this argument emerges in the student as attributes such as professionalism, cognisance, competency, autonomy, synergism, perspicacity, persistence and expertise all of which contribute to the student's overall character. Contextually relative praxis development

central to the student's personal and professional transformation, is presented as the generator of wisdom.

**Lindner, J., R and K. Dooley, E (2002). "Agricultural Education Competencies and Progress toward a Doctoral Degree." *Journal of Agricultural Education* 43(1): 57-68.**

**Abstract:** This study was designed to describe the compilation of doctoral students' knowledge, skill, and abilities as they progressed toward a degree in agricultural education. A census of beginning, middle, and end of program doctoral students at Texas A&M University was conducted. An 85% response rate was achieved. Data for the study were collected by mailed questionnaire and online through the Internet. Study findings showed that as doctoral students progressed toward a degree, their Foundations Knowledge, Applications Knowledge, International Knowledge, Social Skills, Content Skills, Process Skills, Complex Problem-Solving Skills, Systems Skills, Resource Management Skills, Verbal Abilities, Idea Generation and Reasoning Abilities, Auditory and Speech Abilities, Attentiveness Abilities, and Perception Abilities increased. Recommendations for validating and authenticating study findings are provided. This study provides a model for benchmarking competencies and provides a taxonomy from which to study and understand/consider agricultural education competencies.

**Kumar, A. & Kumar, V.A. 2014. "Pedagogy in higher education of agriculture." *Procedia - Social and Behavioral Sciences* 152: 89 – 93.**

**Abstract:** Agriculture is continuing as a major contributor to the economies of majority of the countries, particularly developing ones. Its share, however, in the GDP is showing a progressive decline worldwide. In fact, agricultural sector is undergoing rapid changes as a consequence of both technological progress and financial forces which demand an increased market-orientation, competitiveness and higher productivity. With increasing involvement of private players in agriculture, there is a paradigm shift in demand and employment pattern of agricultural graduates to agriculture and allied sectors warranting an urgent need for a revision of existing curricula to better address market as well as educational thrust addressing national priorities/needs. This reorientation should incorporate twin objectives of (i) market-oriented agriculture, and (ii) direct relevance to the improvement of subsistence agriculture and poverty in rural areas. Thus, a great challenge facing many agricultural universities over the next decade will be to introduce radical changes in pedagogy of agricultural so as to meet these challenges by transforming themselves: \*from agricultural universities to universities for rural development, \*from hierarchical organizations to participatory ones, \*from immediate needs to short- and long-term sustainability, and \*from reactive to pro-active organizations. Undoubtedly, universities are better equipped to greatly influence this cause through the technology and trained human resource that they are capable of generating. In the quest for more effective and meaningful teaching and learning methods in agricultural higher education, an attempt is made in this presentation to suggest ways and means for reorienting higher education in agriculture with due emphasis on: \*promotion and adoption of a systems approach in teaching programmes enabling graduates to comprehend agriculture as a system comprised of technical, economic, social and cultural elements, \*enhancement in understanding of students for key management principles such as decision-making skills,\*participatory teaching methods using case studies, problem-solving approaches, group working and interdisciplinary approaches

**Martinich, J. A., S. L. Solarz, et al. (2006). "Preparing students for conservation careers through project-based learning." *Conservation Biology* 20(6): 1579-1583.**

**Abstract:** No abstract

**McAndrews, G., J. Goodwin, et al. (2006). "Using Environmental and Ethical Issues for Debate in an Introductory Agronomy Course." NACTA Journal: 54-61.**

**Abstract:** As modern societies place greater demand on natural resources, professionals working in areas impacting natural resources will increasingly have to work with others to address contentious issues. Students studying agriculture and natural resource related fields would benefit from improved professional skills in debate and discussion of complex issues. In this study, we investigated student perspectives on debate in an introductory agronomy course using the following questions: 1) what are student perceptions of debate as a pedagogical method in an agricultural classroom? And 2) Do the students find that debate improves their content learning and communication skills? In 2005, 106 students completed surveys with agree/disagree statements, and short answer questions regarding debate. When participating students were asked why they had chosen to participate in the class debate part of the course, 85% listed "intrinsic" or learning goals, and 83% of the participants listed extra credit points as one of their motivations. Eighty-seven percent of the participants expressed that debate contributed to their learning of course material. Students appreciated the way the debates encouraged them to go from passive knowledge of course content to active application of the material, and helped them improve their communication skills and learn about different points of view. Students' overall evaluation of the debate experience was positive, with only two negative responses. This study suggests that incorporating debate in the agricultural classroom was an effective pedagogical method for improving content learning and strengthening student skills in professional discourse on controversial societal issues.

**Monteiro, A. A. (2004). Using Vegetable Crops as a Tool for Crop Science Active Learning. IV International Symposium on Horticultural Education.**

**Abstract:** This paper reports the use of vegetable crops as a hands-on tool for active learning crop science in an agriculture university college. During the course on vegetable crop science and technology each pair of students receive a plot of land where they grow a vegetable crop from February to June. The students are free in their options but have to justify the decisions about the methods and techniques they apply. They also compare alternative methods and techniques e.g. amount of N, plant spacing, seed drilling depth, soil mulching, and evaluate the results. The obligatory items to be reported are: (1) the choice of the crop; (2) crop adaptation to local soil and climatic conditions; (3) crop establishment; (4) the use of fertilizers; (5) irrigation timing and amount; (6) integrated pest and disease management; (7) harvest timing; (8) crop yield; (9) produce quality evaluation. Decision-making along the cropping cycle is a fundamental part of the work. The students have an opportunity for linking research with practice and for making a cost-benefit analysis of their decisions. At the end of the semester the students submit a written report and give a ten-minute oral presentation about their crop, which is followed by a commentary by the teachers and an open discussion among all students present. Students value this work and express great satisfaction for having the opportunity for interacting with plants and for applying and integrating their knowledge. They usually show difficulties on transferring the information from the literature to the field, on quantifying inputs, and on interpreting crop reactions.

**Torres, R., M and J. Cano (1994). "Learning Styles of Students in a College of Agriculture." Journal of Agricultural Education 35(4): 61-66.**

**Abstract:** A brief narrative description of the journal article, document, or resource. A study to determine the preferred learning style of students (n=92) enrolled in the College of Agriculture at Ohio State University concluded that a field-independent learning style was preferred and that instructors need to be sensitive to learning style differences and should incorporate various teaching methods. (JOW)

**Turner, B. L., Esler, K. J. et al. 2016. "Socio-Environmental Systems (SES) Research: what have we learned and how can we use this information in future research programs." *Current Opinion in Environmental Sustainability* 19:160–168.**

**Abstract:** The call for integrated social–environmental science, complete with outreach to applications and solutions, is escalating worldwide. Drawing on several decades of experience, researchers engaged in such science, completed an assessment of the design and management attributes and impact pathways that lead to successful projects and programs and to understand key impediments to success. These characteristics are delineated and discussed using examples from individual projects and programs. From this, three principal lessons leading to successful efforts emerge that address co-design, adaptive or flexible management, and diversity of knowledge. In addition, five challenges for this science are identified: accounting for change, addressing sponsorship and timelines, appreciating different knowledge systems, adaptively communicating, and improving linkages to policy.

**Packham, R.G., Ison, R.L. & Roberts, R.J. 1998. *Soft-systems Methodology for Action Research: The Role of a College Farm in an Africultural Education Institution. Agric. Admin & Extension* 30: 109-126.**

**Abstract:** This paper is concerned with the definition of the role and purpose of college and university farms in the face of changing socio-economic environments. Features of the particular situation investigated included reduced funding, and major curriculum reform based on concepts of experiential learning. The Checkland soft-systems methodology was adopted within an action research framework to manage change using a consensus approach. The outcomes of the research process were twofold. First, there was an improvement in the farms, manifest by increased financial returns, a better working climate and greater use of the farms in the experiential education process. Secondly, the researchers learnt about the use of the Checkland methodology, and how it is able to accommodate purposeful behaviour and issues of power. Such dual outcomes are a feature of action research.

**Whittington, M.S. 1995. "Higher order thinking opportunities provided by professors in college of Agriculture classroom." *Journal of Agricultural Education* 36 (4) 32-38.**

**Abstract:** Accomplishing higher order thinking requires analysis or understanding of the new situation, a background of knowledge of methods which can be readily utilized, and some facility in discerning the appropriate relations between previous experience and the new situation (Bloom, 1956). Mastering the higher order thinking of which Bloom speaks is one of the most significant activities of life. How are professors in a College of Agriculture performing? A variety of instruments including an aspiration survey, and attitude scale, a demographic form, and an assessment instrument were used in a study of 28 purposefully selected faculty members from each of eight departments/schools in a College of Agriculture to examine relationships among the variables. It was found that professors aspired classroom discourse to be balanced across the levels of cognition. However, a preponderance of discourse occurred at the lower levels of cognition, regardless of the course level or subject area. Do professors desire to change the cognitive level of discourse in their classrooms? As agricultural educators, important responsibilities include educating colleagues on current teaching issues. The issue of teaching critical thinking must be addressed in today's learning environment. There is every reason why agricultural educators should be leading this trend, considering the diverse directions agriculture has taken.