I. Introduction

Interdisciplinary learning is a twenty-first-century imperative. We are continually faced with societal and global challenges that require interdisciplinary thinking to identify suitable solutions, such as finding new energy sources, dealing with the effects of our changing climate, and ensuring populations across the globe have adequate food and healthy living environments. In addition, research in the STEM (science, technology, engineering, and mathematics) disciplines is increasingly crossing traditional disciplinary lines with scientists and engineers collaborating in both basic and applied research projects.

In a 2009 report from the National Academies, *A New Biology for the 21st Century*, the interdisciplinary and integrative nature of the biological sciences is described with respect to issues related to global food, health, environment, and energy challenges. This report follows on the heels of others from the National Academies, such as the 2004 report *Facilitating Interdisciplinary Research*, which outlined specific strategies for making research environments more conducive to collaboration. Thus, all college graduates—STEM majors as well as non-majors—must be able to traverse the complexities of our interdisciplinary and integrated world effectively.

"Fostering students’ abilities to integrate learning—across courses, over time, and between campus and community life—is one of the most important goals and challenges of higher education."

—Association of American Colleges and Universities and The Carnegie Foundation for the Advancement of Teaching, Integrative Learning Project.

Interdisciplinary thinking is rapidly becoming an integral feature of the research as a result of four powerful “drivers:” the inherent complexity of nature and society, the desire to explore problems and questions that are not confined to a single discipline, the need to solve societal problems . . . students, especially undergraduates, are strongly attracted to interdisciplinary courses, especially those of societal relevance."


Authors:

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Keck/PKAL Facilitating Interdisciplinary Learning (FIDL) Project

In order to identify specific strategies for facilitating interdisciplinary learning, teams from twenty-eight colleges and universities—representing the diversity of higher education in this country—participated in the PKAL Facilitating Interdisciplinary Learning initiative funded by the W. M. Keck Foundation. During the course of the project, over three hundred faculty and campus leaders were engaged, participating in five national meetings, including two roundtables focused on assessment and leadership. Teams were chosen based on their vision for and commitment to an interdisciplinary learning project; most teams were at the beginning of a process for creating a new interdisciplinary program or facility on their campus (selected campus case study summaries are found in Appendix B). Teams were surveyed at the beginning and the end of the project regarding institutional structures, barriers, climate, and other issues. Teams submitted annual reports as formative measures of progress.

Further details of the work can be found in the project’s summary report (http://www.aacu.org/pkal/interdisciplinarylearning/documents/KeckExecutiveSummary_001.pdf) and the project’s website (http://www.aacu.org/pkal/interdisciplinarylearning/index.cfm). The five key recommendation areas are summarized below.

**Five key recommendations**

1. Start by articulating a common understanding of STEM interdisciplinary learning goals that will drive the cycle of curricular innovation, development, assessment, and improvement.

2. Use assessment to connect interdisciplinary learning goals with program structure, content, and pedagogy, paying attention to students as individual learners, who come with diverse backgrounds, experiences and expectations, career aspirations, and goals.

3. Build a critical of mass of faculty, from within and with new hires, that assumes leadership responsibility in the iterative process of shaping interdisciplinary curricular and co-curricular approaches and in assessing the impact of those approaches on undergraduate STEM learners.

4. Incorporate interdisciplinary program needs into the processes of campus governance and resource distribution—financial, personnel, equipment, and spaces.

5. Align interdisciplinary learning with the institutional vision, mission, and identity, as well as in strategic planning processes at all levels.

This report translates these recommendations into a roadmap for campus leaders seeking to plan new or revised interdisciplinary programs with the goal of creating an environment in which these programs can be sustained over the long term.

Summaries of selected campus case studies from the project are provided in Appendix B.
How to Use This Guide

This guide is devised as a roadmap that is framed as a series of questions that leaders can use to develop an action plan for planning, implementing, and evaluating interdisciplinary learning experiences for students. The roadmap follows the process of building and sustaining interdisciplinary programs described in the Keck/PKAL summary report (Figure 1).

Mobilizing -> Implementation -> Institutionalization

The process begins with mobilizing a team of faculty and campus leaders to plan the program or projects. Once planned, programs are implemented, starting small with pilot programs that are tied to deliberate assessment methods that will measure the initial success and point to places for improvement and scale-up. The final stage, institutionalization, is the most difficult. To achieve this stage, campuses must commit to the program, reviewing the evidence of its success and then refining infrastructure and resource requirements, and persist in supporting the program over the long haul.

The roadmap uses a flow chart approach that is aligned with the model described above and which create a framework for developing and implementing an action plan for more intentional and successful interdisciplinary programs. The charts present a series of questions to aid campus leaders in taking an inventory of the situation on their campus and deciding on next steps. If the answer to a question is yes, the “check-in” boxes contain descriptions and definitions so that leaders can check that their “yes” aligns with the recommendations presented here. If the answer is no, strategies and resources identified in the Keck/PKAL project are given to provide options for how that particular step might be achieved.

Figure 1. Process for building and sustaining interdisciplinary programs
(See Summary Report)
Section IV. Moving to Institutionalization

...it is easier to understand colleges and universities when you learn to think of them simultaneously as machines, families, jungles, and theaters. Each of those images corresponds to a different frame or perspective that captures a vital and distinctive slice of institutional life.

—Bolman and Gallos, p. 11.

At this point in the roadmap, campus leaders have outcomes, a programmatic approach, an assessment plan, and have piloted the program. The challenge now is how to move from implementation to institutionalization. Unfortunately, this is often the point when support for interdisciplinary programs falls apart. Specifically, if a program was created by a single faculty member or a small group of faculty working in isolation and is unconnected to institutional mission, goals, and culture, no foundation exists for institutionalization. However, if the strategies and approaches recommended in this guide have been used, the likelihood that the program can be sustained by the institution is high.

Institutionalization depends on alignment of supporting infrastructures with program needs in order to support the desired outcomes. This section of the roadmap is essentially about infrastructure and resources broadly defined and institutional cultures embracing and celebrating interdisciplinary programs.

The approach in this section uses the “Four Frames” model of Bolman and Dean (Bolman and Deal, 4th ed) to focus the discussion and strategies on framing questions used by that model. In summary, the four frames are associated with the following points of view:

- Human resources frame (the family): Do you have (and can you keep) the right people?
- Structural frame (the machine): Do you have enabling structures?
- Political frame (the jungle): Have you worked and created alignment with faculty governance?
- Symbolic frame (the theater): Do you celebrate faculty work in interdisciplinary areas and recognize achievement of key milestones in reaching interdisciplinary goals?

In the following sections, the discussion and strategies are focused on these four frames and the particular issues within those frames (sub-questions) that are important to consider in order to achieve long-term success in interdisciplinary programs.
**Question 1 (Human Resource Frame): Do you have (and can you keep) the right people?**

*People have a great capacity to learn and often an even greater capacity to defend old attitudes and beliefs. From a human resource perspective, the key challenge is to tailor organizations to individual—to find a way for people to get the job done while feeling good about what they are doing.*


*Effective academic leaders create caring and productive campus environments where all find ways to channel their full talents to the mission at hand and to work cooperatively with important others.*

—Bolman and Gallos, p. 12.

**Bolman and Deal: Basic Human Resource Strategies (p. 136, 3rd ed.):**

- Build and implement an Human Resource Management (HRM) strategy
- Hire the right people
- Keep them
- Invest in them
- Empower them
- Promote diversity

If you have people with 1) appropriate ID expertise, 2) appropriate incentives, and 3) appropriate faculty development, you have the essential elements for this frame.

The essential elements for this frame are having the right people, appropriate incentives, and professional development programs to support their teaching, assessment, and program evaluation activities.

**Strategies for getting faculty and staff with appropriate interdisciplinary expertise:**

- Hiring procedures that permit the hiring of faculty who are not affiliated with specific departments but are instead affiliated with multiple departments and/or an interdisciplinary program
- Seek new faculty lines that target areas of teaching and research at the interface of more than one discipline, in the context of an anticipated interdisciplinary initiative; for campuses with adjunct faculty, hire individuals with industry or other relevant work experiences that will bring the real world closer to students.
- Incorporate interdisciplinary teaching and assessment strategies in educational training programs for graduate students
- Use of MOUs
- Use Council of Environmental Deans and Directors (CEDD) documents on hiring and promoting interdisciplinary faculty
- Include a phrase about “interest in interdisciplinary programs” in disciplinary job advertisements; including related questions during the interview process
- Create a clearinghouse list of faculty whose appointments are exclusively or partially in interdisciplinary programs
- Engage early-career faculty at all levels. They have fresh relevant ideas and experiences, especially in the research realm.

**Strategies for encouraging participation:**

- Create faculty review, promotion, and tenure policies to recognize and reward faculty efforts toward engaging students in interdisciplinary learning in STEM fields.
- Provide timely incentives and make targeted support available for interdisciplinary faculty, staff, and students, including funds for travel, program development, and improvement efforts (course release, supplies for initial course offerings, sabbaticals, etc.).
- Provide refreshments at gatherings, when possible
Strategies for developing faculty:

- Promote formal and informal conversations (within divisions, through learning/teaching centers, within campus committees, during retreats) that offer recurring opportunities for collective discussions about the value of interdisciplinary learning for students for whom they have common responsibility.
- Faculty learning communities
- Promote formal and informal conversations between interdisciplinary faculty as mentors and advisers with students pursuing and exploring interdisciplinary learning opportunities.
- Create campus faculty development opportunities to ensure competence in developing, assessing, and teaching in interdisciplinary learning environments
- Promote faculty learning communities around interdisciplinary learning goals, program planning, and assessment
- Offer workshops and programs through campus centers for teaching and learning that focus on interdisciplinary learning outcomes and assessment
- Create and participate in regional networks of campuses or colleagues that leverage experience and expertise to create collaborations around interdisciplinary research and learning environments

Question 2 (Structural Frame): Do you have enabling structures?

Structures—commonly depicted by organizations charts—are designed to fit an organization’s environment and technology. Organizations allocate responsibilities to participants... They then create rules, policies, procedures, and hierarchies to coordinate diverse activities into a unified strategy. Problems arise when structure is poorly aligned with current circumstances.


Academic leaders succeed when they create an appropriate set of campus arrangements and reporting relationships that offer clarity to key constituents and facilitate the work of faculty, students, staff, and volunteers.

—Bolman and Gallos, p. 11.

Strategies for creating workload policies that support ID pedagogy and teaching:

- Align budgetary structures, allocation, and reallocation procedures to support interdisciplinary programs, faculty, students, and spaces. It isn’t always about adding on, but often about redistributing—and the structures for both need to be transparent.
- Align institutional fundraising initiatives, including the search for federal and private agencies, with support for programmatic and institutional goals regarding interdisciplinary learning.
- Integrate efforts to renew, recycle, renovate, and create new learning spaces in the process of making decisions about institutional priorities and budgets.
- Establish formal administrative structures and leadership positions in support of interdisciplinary programs (e.g., Center for Interdisciplinary Studies, dean of Interdisciplinary Studies, Center for Materials Science).

Strategies for P&T policies to support interdisciplinary teaching:

- Review P&T policies for ID support
- Consider mechanisms for ensuring that divisional or campus-wide voices are heard in tenure and promotion decisions as they relate to interdisciplinary learning
- Use MOUs to clarify how P&T decisions will be made for ID faculty
Interdisciplinary and multidisciplinary research is not without its challenges. A lack of reward for collaborative research in the tenure and promotion process, expectations to complete work in both the department and research centers, and challenges to academic norms often lead to conflicts between disciplines and interdisciplinary work. However, the benefits of interdisciplinary research – the development of innovative and creative research, technology transfer with industry, increased likelihood of receiving external funding, and individual satisfaction for contributing to society—underscores the necessity that teams working together overcome those obstacles. Simply put, the benefits of interdisciplinary and multidisciplinary research outweigh the challenges.


Strategies to create appropriate physical space for interdisciplinary programs/projects:

- Integrate efforts to renew, recycle, renovate, and create new learning spaces in the process of making decisions about institutional priorities and budgets.
- Establish formal administrative structures and leadership positions in support of interdisciplinary programs (e.g., Center for Interdisciplinary Studies, dean of Interdisciplinary Studies, Center for Materials Science).
- Consider the adjacencies of faculty offices and gathering spaces for students; determine if they promote interdisciplinary interactions among faculty and students and between faculty and students.
- Repurposing space and other infrastructures allows institutions to address creatively needs for interdisciplinary learning in ways that aren’t additive, which ensures more complete integration into institutional culture.
- Create/renovate spaces and facilities to promote interdisciplinary learning. New spaces aren’t always required—renovations offer an opportunity to consider developing spaces that will facilitate interdisciplinary learning.

Strategies for funding interdisciplinary programs/projects:

- Align budgetary structures, allocation, and reallocation procedures to support interdisciplinary programs, faculty, students, and spaces. It isn’t always about adding on, but often about redistributing—and the structures for both need to be transparent.
- Align institutional fundraising initiatives, including the search for federal and private agencies, with support for programmatic and institutional goals regarding interdisciplinary learning.
- Include development staff in planning meetings, or meet with them separately, to ensure interdisciplinary learning and program goals are on the fundraising agenda.
- Ensure interdisciplinary programs have the same rights and responsibilities as disciplinary programs, from approval to program review; ensure that interdisciplinary program faculty and/or directors are present at budget and other institutional planning meetings; create governance documents or memorandums of understanding to make explicit the support of interdisciplinary programs.
- Create transparent financial policies, including criteria for how budgets are established and reviewed; align program aims with needed resources.
- Negotiate or adjust indirect costs from interdisciplinary grants to go to interdisciplinary faculty development or interdisciplinary teaching buy out.

Strategies for communication to communities both internal and external to the institution:

- Web pages, department and university level
- Newsletters (print and electronic)
- Email blasts or listserv postings
- Blogs
- Tweeting
- Publishing articles in trade and education journals
- Conference presentations
**Question 3 (Political Frame): Have you worked and created alignment with faculty governance?**

[The political frame] sees organizations as arenas, contests, or jungles. Parochial interests compete for power and scarce resources. Conflict is rampant because of enduring differences in needs, perspectives, and lifestyles among competing individuals and groups. Bargaining, negotiation, coercion, and compromise are a normal part of everyday life. Coalitions form around specific interests and change as issues come and go. Problems arise when power is concentrated in the wrong places or is so broadly dispersed that nothing gets done.

—Bolman and Deal, 3rd ed., p. 15.

Skilled academic administrators are compassionate politicians who respect differences, manage them productively, and respond ethically and responsibly to the needs of multiple constituencies without losing sight of institutional goals and priorities.

—Bolman and Gallos, p. 12.

One of the biggest perceived barriers with respect to sustaining ID programs is conflicts with department silos/territories/expectations and competition for resources (financial, student, faculty, space). Most institutions are organized in a departmental structure that can create silos that are difficult to negotiate. However, departments don’t have to be a barrier and the strategies below provide approaches to navigating this complicated political terrain.

In addition, considerations must be made to including the leaders of ID programs in appropriate faculty governance structures.

Another common stumbling block are the curriculum approval procedures that are traditionally aligned with traditional departmental and governance structures.

**Strategies for including departments in the conversation:**

- Ensure interdisciplinary programs have the same rights and responsibilities as disciplinary programs, from approval to program review; ensure that interdisciplinary program faculty and/or directors are present at budget and other institutional planning meetings; create governance documents or memorandums of understanding to make explicit the support of interdisciplinary programs.
- Overcoming departmental barriers is probably the biggest challenge to interdisciplinary programs—create strategies for addressing these challenges early in the process; don’t ignore departments in the process—include them early on, especially the department chair or other department leaders.

**Strategies for including interdisciplinary faculty on faculty governance committees:**

- Ensure multiple disciplines are present, including those not obviously connected with current interdisciplinary programs.
- Put out a campus-wide call for volunteers, you never know who might be interested!

**Strategies for curricular approval and review procedures that are friendly to interdisciplinary programs/projects:**

- Ensure campus curricular approval and review processes enable the development of interdisciplinary learning courses and programs.
- Create a new structure or subcommittee to review ID course and program proposals.
- Check that the curriculum forms allow courses and programs to be identified as interdisciplinary, and provide space for various department level approvals and comments.
Question 4 (Symbolic Frame): Do you celebrate faculty work in interdisciplinary areas and recognize achievement of key milestones in reaching interdisciplinary goals?

The symbolic frame, drawing on social and cultural anthropology, treats organizations as tribes, theaters, or carnivals. It abandons assumptions of rationality more prominent in other frames. It sees organizations as cultures, propelled more by rituals, ceremonies, stories, heroes, and myths than by rules, policies, and managerial authority.

—Bolman and Deal, 3rd ed., p. 15.

Good theater fuels the moral imagination, and successful campus leaders infuse everyday efforts with energy and soul.

—Bolman and Gallos, p. 12.

Strategies:

• Celebrate achievement of key interdisciplinary milestones and successes
• Submit press releases regarding program accomplishments, outings, or events to the campus newspaper
• Organize an alumni panel of the program during freshmen orientation or at homecoming
• Host a speaker series on topics related to the interdisciplinary program goals
• Ensure that program reports and accomplishments are sent to all levels of the administration
• Visibly support interdisciplinary projects with travel funds, meeting space, and course release/reassignment
• Ensure that formal campus leaders attend interdisciplinary project/program planning meetings
• Support interdisciplinary faculty research alliances and partnerships by creating visible support mechanisms (funding and space allocation)

Appendix A. References cited

Appendix B. Selected Case Studies

**INSTITUTION:** Bradley University, Peoria, IL

**OBJECTIVE:** To develop new interdisciplinary STEM courses appropriate to meet the institution’s general education requirements

**SUCCESSFUL STRATEGIES:**

- Articulate alignment of the initiative with institution’s strategic plan
- Identify champions (faculty and administrative) from all STEM units on campus
- Identify barriers to faculty participation
- Identify barriers to implementation
- Align learning goals for interdisciplinary STEM courses with learning goals for general education program
- Provide incentives and professional development for faculty to engage in course development and assessment
- Create opportunities for faculty to collaboratively brainstorm interdisciplinary course topics and how they could contribute to these topics from their unique disciplinary perspectives (Imagineering of hypothetical new courses)

**CONTACT:** Kelly McConnaughay, kdm@bmail.bradley.edu

**ARTIFACTS:**

- Student learning outcomes
- Assessment plan

**INSTITUTION:** New York City College of Technology, CUNY

**OBJECTIVE:** To engage student interest in interdisciplinary learning and to establish a faculty interdisciplinary STEM community

**SUCCESSFUL STRATEGIES:**

- Create faculty learning communities
- Conduct faculty workshops
- Connect to national and global needs (e.g., climate change, energy issues)
- Use of a web site to create a synchronous and asynchronous environment for STEM learning
- Audit of existing campus interdisciplinary initiatives
- Celebration/publicity of interdisciplinary undergraduate research projects

**CONTACT:** Reneta Lansiquot, rlansiquot@citytech.cuny.edu

**ARTIFACTS:**

- List of criteria for recognition as an interdisciplinary course
**INSTITUTION:** Davidson College, Davidson, NC

**OBJECTIVE:** Increase opportunities for interdisciplinary learning for students: create policies for the hiring of ID faculty, create greater stability for existing ID programs, create more ID majors.

**SUCCESSFUL STRATEGIES:**

- Review of best practices both internal and external to Davidson
- Full administrative support
- Publicity for ID successes
- Ramping up existing in-house ID models
- Open and frequent communication with all stakeholders

**CONTACT:** Scott Denham, scdenham@davidson.edu

**ARTIFACTS:**

Structure for hiring, tenure, and promotion of ID faculty

**INSTITUTION:** Florida Agricultural and Mechanical University, Tallahassee, FL

**OBJECTIVE:** Establish a Learning Community to Support Holistic Approach to STEM Education

**SUCCESSFUL STRATEGIES:**

- Implemented integrated research projects with STEM and non-STEM faculty
- Integrated interdisciplinary assessment into University’s quality enhancement plan
- Developed interdisciplinary orientation course for first-year students
- Implemented seminar series to increase faculty and student engagement
- Discussions with key stakeholders

**CONTACT:** Bernadette Kelley, Associate Professor of Education, Bernadette.kelley@famu.edu

**ARTIFACTS:**

- Syllabi for interdisciplinary orientation course for first-year students

**INSTITUTION:** Grinnell College (with Carleton College, Hope College, and Indiana University)

**OBJECTIVE:** Understand and Assess Student Learning in Science-Rich Interdisciplinary Courses

**SUCCESSFUL STRATEGIES:**

- Interviewed faculty and students
- Conducted RISC survey (Research on Integrated Science Curricula) at seven institutions
- Supported classroom research projects examining specific student learning outcomes

**CONTACT:** Jim Swartz, Dack Professor of Chemistry, swartz@grinnell.edu

**ARTIFACTS:**

- RISC survey (Research on Integrated Science Curricula)
INSTITUTION: Indiana University, Bloomington, IN

OBJECTIVE: Develop Human Biology Curriculum (Integrative Undergraduate Degree in Human Biology)

SUCCESSFUL STRATEGIES:

- Backward design approach
- Faculty driven development of assessment
- Support from campus teaching and learning offices
- Partnerships with campus education experts
- Supporting conference attendance and use of external experts to facilitate faculty learning related to assessment

CONTACT: Whitney Schlegel, Associate Professor of Biology, wreilly@indiana.edu

ARTIFACTS:

- Interdisciplinary learning outcomes for human biology degree program

INSTITUTION: Jacksonville University, Jacksonville, FL

OBJECTIVE: Develop Interdisciplinary Project Between Biology and Engineering

SUCCESSFUL STRATEGIES:

- Participation in a national research competition on a real world problem

CONTACT: Clements, Lee Ann, lclemen@ju.edu

ARTIFACTS:

- Course syllabus

INSTITUTION: James Madison University, Harrisonburg, VA

OBJECTIVE: Development of Courses and Interdisciplinary Research and Learning Experiences to Develop Connections between Biology and Mathematics

SUCCESSFUL STRATEGIES:

- Use of task forces with broad representation across disciplines

CONTACT: David Brakke, Dean, College of Science and Mathematics, brakkedf@jmu.edu

ARTIFACTS:

- Course syllabus
INSTITUTION: Lafayette College, Easton, PA

OBJECTIVE: Development of a Multidisciplinary Life Sciences Minor Program

SUCCESSFUL STRATEGIES:

- Inclusion in College’s strategic plan
- Multidisciplinary team including administrators
- Audit of faculty interest and ongoing initiatives
- Review of best practices at other institutions
- Learning community approach for team
- Focus on mission and student learning outcomes—backward design
- Development of hiring and review policies for interdisciplinary faculty positions (in conjunction with other multidisciplinary campus initiatives)
- Faculty conversations program
- Meetings with department heads in all areas of the College

CONTACT: Mary Roth, Associate Provost for Academic Operations, rothm@lafayette.edu

ARTIFACTS:

- Summary of program elements
- Rubric for assessment of student learning outcomes (to be used during annual retreat including students and faculty and focusing on presentations and discussions related to the students’ capstone projects)

INSTITUTION: Ohio State University, Columbus, OH

OBJECTIVE: Development of an Integrated Science Course as Part of Bridge Program for STEM Majors

SUCCESSFUL STRATEGIES:

- Interdisciplinary steering committee
- Regular committee meetings
  - to facilitate opportunities for joint assignments and multi-disciplinary examples in skill courses
  - to discuss feedback and possible revisions
- Use of authentic problems for both faculty and students to learn importance of interdisciplinary learning
- Review of best practices from other institutions

CONTACT: Judith Ridgeway, Assistant Director of the Center for Life Sciences Education, ridgeay.14@osu.edu

ARTIFACTS:

- Course syllabus
INSTITUTION: University of Richmond, Richmond, VA

OBJECTIVE: Design of First-Year Integrated Quantitative Science Course

SUCCESSFUL STRATEGIES:

- Course release for faculty involved in project
- Realistic project schedule for development and implementation
- Regular meetings of project faculty
- Use of semester themes to integrate material

CONTACT: Lisa Gentile, Professor of Chemistry, lgentile@richmond.edu

ARTIFACTS:

- Course syllabus

INSTITUTION: Willamette University, Salem, OR

OBJECTIVE: To expand the interdisciplinary nature of Fundamentals of Neuroscience course—an introductory course in the sciences that is interdisciplinary and for students fulfills the science general education requirement while also serving as the gateway course for a major in neuroscience—and better understand how the course facilitated science literacy in order to create a model for other interdisciplinary science courses.

SUCCESSFUL STRATEGIES:

- Pre- and post- assessment of students in the neuroscience course as well as students in traditional non-interdisciplinary introductory science courses.
- Engage as many stakeholders as possible (focus on relatively new faculty)
- Parlay seed funding into new grant proposals
- Share information openly and advocate for other interdisciplinary stakeholders

CONTACT: Mark Stewart, mstewart@willamette.edu

ARTIFACTS:

- Break and argument (BAA) task
- Biology Self Efficacy scale (BSE; Baldwin, Ebert-May, and Burns, 1999)
- Free Will and Determinism scale (FAD; Paulhus & Margesson, 1994)