



Western Michigan University
ScholarWorks at WMU

STEM Instructional Graduate Teaching
Assistant Posters

Office of Faculty Development

Fall 9-11-2019

Interdisciplinary Projects Help Fulfil Psychological Needs Of University Students

Hamid Mehmood Pasha

Western Michigan University, hamidmehmood.pasha@wmich.edu

Follow this and additional works at: <https://scholarworks.wmich.edu/stem-gta-posters>

 Part of the Electrical and Computer Engineering Commons

WMU ScholarWorks Citation

Pasha, Hamid Mehmood, "Interdisciplinary Projects Help Fulfil Psychological Needs Of University Students" (2019). *STEM Instructional Graduate Teaching Assistant Posters*. 8.

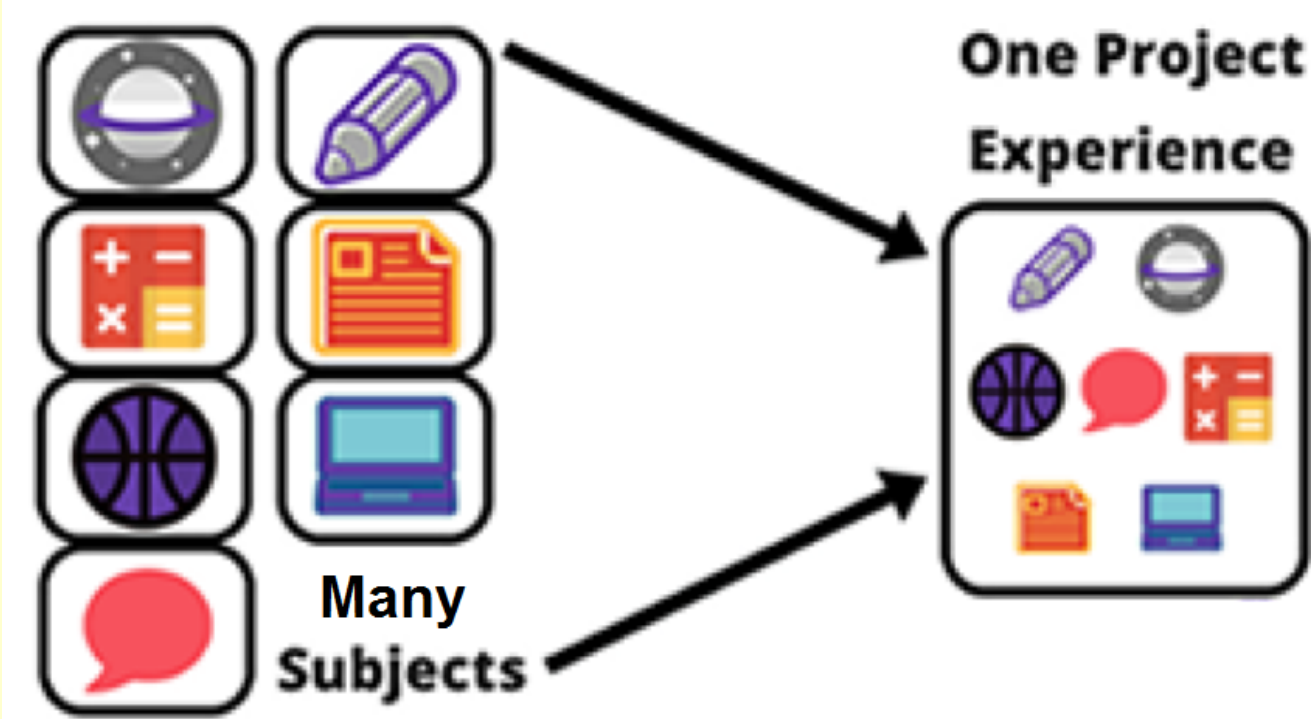
<https://scholarworks.wmich.edu/stem-gta-posters/8>

This Poster is brought to you for free and open access by the Office of Faculty Development at ScholarWorks at WMU. It has been accepted for inclusion in STEM Instructional Graduate Teaching Assistant Posters by an authorized administrator of ScholarWorks at WMU. For more information, please contact maira.bundza@wmich.edu.



Introduction

Every scientific discipline is based on a specific body of concepts and presumptions. These concepts are crucial for understanding the design and implications of a situation. Therefore, it is believed that an interdisciplinary approach to research projects will help in generating a successful change to encourage an evolution in higher learning at University level. Student retention can be increased by introducing interdisciplinary study projects which may involve students from the engineering, economics, social, history, language and/or human sciences departments. This is done to increase the basic psychological needs of the students in helping promote the academic engagement. Such projects can contribute to overall improvement in the higher education department, as they fulfil the psychological requirements of the students and satisfy their need for academic engagement and increase them in relatedness, competence and autonomy. Real life project teams are predominantly interdisciplinary. In order to organizing a model with a similar aspect, a lot of organizational work and co-operation is needed between teachers of the different disciplines and courses and the time to prepare the projects for future evaluation and studies (1).



Theoretical Background

Human beings are naturally inclined to seek for novel challenging experiences which include opportunities to learn, grow and improve in their competencies. Motivation, whether intrinsic or extrinsic, can be stimulated when the following 3 psychological needs are satisfied [2]:

- **Perceived competence:** Individuals need to feel effective and capable when interacting with their learning environment. This is introduced by providing an adequate measure of difficulty and challenge within the learning environment. Furthermore, students require feedback from their mentors in order for them to understand and master the tasks they are assigned as part of the course work.
- **Relatedness:** The need to experience support and satisfaction in their relationships. This should be coupled with a sense of connectedness and a sense of belongingness with others. A good relationship between course instructors and the students can help build such learning environments. Where students are loved and respected by their teachers and the students and peers can relate toward building a feeling of a community within the classroom.
- **Autonomy:** This is the need for people to feel that their actions are of their own volition and an outcome of their own self-determination. This can be done by allowing students activities which allow them choice and influence concerning the career choices and learning academic activities that they are engaged in.

General Description Of Proposed Projects

The duration proposed for the interdisciplinary projects is one week. Students are to work full time (8 hours a day and 5 days a week) on these projects in a team consisting of 10-12 members. In addition it is suggested that students participate in a participation event one week after the completion of the course project. In order to ensure that no conflicts occur with other courses offered at the University, all other courses can be suspended for the project week. This can be done by allowing the projects to be conducted during the summer or spring breaks as an optional choice for the students who wish to progress their learning capabilities and seek an experience which enriches life long learning and helps build collaboration and respect for the disciplines of the team members. Project work may include several different phases. A first draft solution needs to be proposed at the beginning, which can be scrutinized and further developed under the guidance of experts and scientific teaching staff. At the end of the project week the teams have to present their proposed concept to the professors and scientific teaching staff and experts from various backgrounds (3).



Active Learning Experiences

In order to help students come up with a helpful interdisciplinary solution, they must be encouraged first to come up with good ideas which would require them to activate their area specific knowledge and to learn creativity and innovation to collaborate with their peers with the most promising concept or idea. Students will be tested on how they are able to present their idea to the jury of professors and experts. This approach promotes a significant opportunity to incorporate the elements of student engagement, increase student activity and build an environment of active learning. This project would also help build among students skills such as conflict management, communication skills and negotiation skills and would encourage the students to close the gaps in their knowledge by reading more literature or seeking help and guidance from the experts [2].

Support Team

Teams of students have to be assigned proper and area specific advisors who will be consulted over the course of the project period. All professional questions will be handled by the team of scientific teaching staff. It is proposed that each student group to have a technical advisor and a team advisor throughout the project week. All groups are to be supervised continuously for 5 days. Technical and team advisors therefore can spend 4 hours per group each day during the project week (2). There can also be an initiative for providing a help desk where the project groups can be supported in respect to their team processes e.g. in building relationships and helping develop team work competences with emphasis on behavior moderation and utilization of innovative, problem solving techniques. Experienced supervisors and advisors can provide both types of support as advisors or as technical team leads (1).

Objective

The learning objectives of the interdisciplinary studies are dual purpose. The first objective of the interdisciplinary study projects is to aim for student learning specific discipline oriented competences and providing and helping learn an insight into the methodology and principles of their own field of study as well as the profiles of their peers. Secondly, such interdisciplinary projects help develop team building, communication and increase self-organization and responsibility that values interdisciplinary collaboration (1).

By satisfying the fundamental psychological needs of the students has been proven to increase the following [3]:

- Academic engagement,
- Higher grades,
- Retention of knowledge,
- Professional development,
- Academic achievement,
- Learning experiences,
- Psychological health and well being.



The concept of the project proposals would be discussed and the different knowledge disciplines of the teams would suit the project in the respective ways, as supervised by the advisors and experts.

Infrastructure & Resources

Some of the fundamental needs for the projects include rooms, labs and materials. Each project team needs to be assigned a project room or lab for the entire session of the week. Each project group will also be required to produce a proposal draft which covers the cost of materials required for successful completion of the project tasks.

Logistical support and expert help is also to be provided in the form of technical and team advisors, lab and research assistants for the help desk and jury members for the overall assessment of the projects assigned and presented [2].

INTERDISCIPLINARY CONCEPTUAL BASIS

CONCEPT	DISCIPLINE	KNOWLEDGE AREA	DEFINITION

What Psychological Needs Are Being Fulfilled?

The research questions were aimed to study whether the study projects helped fulfil the basic psychological needs of the students for purpose of building competency, increasing relatedness and garnering autonomy [2].

Construct	Operationalisation
Competence	I was able to make a contribution to the completion of the project using my knowledge in my area of study.
Relatedness	I saw myself in the team as a competent representative of my field of study. Through taking part in the project I have better contact with my classmates.
Autonomy	Through taking part in the project I would work with my teammates on future projects. Through taking part in the project, I have learned how I can solve unforeseen problems during a project. Through taking part in the project, I have learned to make sure that everyone in the team works together constructively (e.g. methods for discussion, moderation, conflict resolution, etc.). Through taking part in the project, I have learned how the distribution of tasks can be successful.
Academic engagement	Having taken part in the project, I feel encouraged to continue studying this subject. Having taken part in the project, I find my field of study even more interesting than before.

Research Questions For The Survey

The main objective of the survey is to study and assess the success rate at which the students were able to meet their basic psychological needs for competence, autonomy and relatedness. The questions also investigate the academic engagement and learning which was promoted through the introduction of such interdisciplinary projects. Some of the main research questions which are suggested as part of the survey are presented below [2]:

1. Do such projects help fulfil the psychological needs for the students for the purpose of acquiring competency, autonomy and relatedness?
2. Are these projects helpful in helping develop academic engagement and?
3. Is there a relationship between the psychological needs of the students and the academic engagements?

Students can be evaluated for these questions based on paper questionnaires before, during, and the end and one week after the project week.

Answers are to be given on a 5-point-Likert scale ranging from 1 (Completely disagree) to 5 (completely agree).

Table 1. Sample.

Field of study	n	Gender		
		Male	Female	No indication
Mechanical and Process Engineering	347	281	46	20
Electrical Engineering and Information Technology	285	252	23	10
Law and Economics	301	225	55	21
Sociology	17	7	10	0
Psychology	13	2	11	0
No indication of field of study	52	25	4	23

Conclusion

In summary, it can be substantiated that interdisciplinary study projects, should be incorporated as an effective measure to increase quality of higher education and engagements of the students on an academic level. A strong focus should be put on helping students study projects which deal with:

- a) Complex, challenging interdisciplinary tasks relating to global, social or every day life issues
- b) Build structures that engage students in building better relationships with their peers and supervisors
- c) Granting students responsibility and authority to self organize in the process of problem solving while they receive support from specialized help teams and experts.

These measures would ensure adequately, that the basic psychological student needs of competence, relatedness and autonomy are fulfilled [4].

References

1. Koch, F. D., Dirsch-Weigand, A., Awolin, M., Pinkelman, R. J., & Hampe, M. J. (2016). Motivating first-year university students by interdisciplinary study projects. *European Journal of Engineering Education*, 42(1), 17-31. doi:10.1080/03043797.2016.1193126
2. Polutnik, J., Druzovec, M., & Welzer, T. (2013). Interdisciplinary projects — Cooperation of students of different study programs. *2013 24th EAEEIE Annual Conference (EAEEIE 2013)*. doi:10.1109/eaeeie.2013.6576532.
3. Beachboard, M. R., Beachboard, J. C., Li, W., & Adkison, S. R. (2011). Cohorts and Relatedness: Self-Determination Theory as an Explanation of How Learning Communities Affect Educational Outcomes. *Research in Higher Education*, 52(8), 853-874. doi:10.1007/s11162-011-9221-8.
4. Palmer, Stuart, and Wayne Hall. "An Evaluation of a Project-Based Learning Initiative in Engineering Education." *European Journal of Engineering Education*, vol. 36, no. 4, 2011, pp. 357-365. doi:10.1080/03043797.2011.593095.

Contact Information:

hamidmehmood.pasha@wmich.edu

Department of Electrical & Computer Engineering, Western Michigan University.