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Abstract

In the modern education system, individuals are raised from an early age to adhere to learning processes focused around the hypothetical. Such conceptual learning, however, has recently been found to be less effective than a comparable style of learning called Experiential Learning, which is the process of learning by doing. By engaging students in hands-on experiences and reflection, they are better able to connect theories and knowledge learned in the classroom to real-world situations. However, the flexibility of Experiential Learning leaves it open to a wide range of interpretations, which does not establish a consistent benchmark.

This research project focuses on establishing a concrete definition for Experiential Learning through the analysis of various experimental scenarios and how it is measured in the post-secondary learning environment. Taking into consideration the inductive processes we utilize to code our collected data, as well as the criteria we collect to filter our data. Such work would benefit a large part of the population through a more effective learning process and will allow other researchers to determine whether scenarios and other experiences fit the criteria to be evaluated as an experiential learning setting as well as design experiments that better reflect experiential learning as a whole.

Advancing the Study of Experiential Learning: Toward Evidence-Based Effectiveness

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Keywords: Experiential Learning, Dewey, Kolb, Cognitive Development, Critical Thinking, Activities, HPL Framework.

1 Introduction

1.1 Background

Experiential Learning (EL) is a teaching method in which a student transforms experience into knowledge. EL varies from traditional teaching methods in that the student is not introduced to concepts in the hypothetical. Instead, students learn classroom concepts through first-hand experience. The term is freely applied to a diverse set of activities, and as such a more specific summary can not be generalized to instances of EL. Typical genres of ELA include project-based learning (Seow, Pan, Koh 2019), clinical rotations (Watters, Stabulas-Savage,

Toppin 2015), service learning (Parker, Myers, Higgins 2009; Weiler, Haddock, Zimmerman 2013), internships (Hayles 2019; Ralph, Walker, Wimmer 2009; Rios, Herremans, Wallace 2018; Stansbie, Nash, Chang 2016), classes (Parker, Myers, Higgins 2009), flipped classrooms (Simmons, Webb, Brandon 2004), simulations (Rossler Kimble 2015; Nadeau, Snowden, Gattamorta 2020; Kennedy, Jewell, Hickey 2020), roleplay (Schmid Rolvsjord 2020; Steck, Engler, Ligon 2011) and serious games (Ranchhod, Gurau, Loukis 2014; Zawadzki, Danube, Shields 2012).

EL is not limited to any category or label, as the term has been assigned to rock climbing (Ozen 2015), art criticism (Wikstrom 2000), automatic speech recognition (Mroz 2018), a cafe events (Wick, Haley, Gash 2019), and a modified book club (Stewart Santiago 2006). There is no limit to the variations of ELA. Alongside its flexibility, EL has an overwhelmingly positive public perception. EL is viewed as a more practical alternative to traditional teaching methods. By introducing students to practical experiences, EL seems to offer an effective way to connect practice and theory. EL is widely considered a strategy to improve self-efficacy as well. Self-efficacy refers to the individual's belief in their own competence, and has been linked to a wide range of positive outcomes

The flexibility of EL's definition combined with its positive public perception presents a contradiction. If EL does not refer to any specific activity, then any statement describing the efficacy of ELA as a whole is not meaningful. To the extent that activities labeled as EL are deemed "effective" without a corpus that proves effectiveness backing them up, the less we can say about the true usefulness of EL as a learning method. This threatens to undermine the legitimacy of the field as a whole.

1.2 Origins of Experiential Learning

Often regarded as the father of EL, David Kolb viewed learning as a continuous process. According to Kolb, learning is not a process that begins and ends when an instructor deposits knowledge into the blank slate of a student. Instead, learning is an ongoing process in which experience continuously modifies pre-existing concepts (Kolb 1984). Building upon his theory, Kolb proposed a four stage cycle for learning consisting of: concrete experiences, reflective observation, abstract conceptualization, and active experimentation. The first one emphasizes personal involvement with people in everyday situations, relying on feelings in order to develop an open-minded, creative ideology. For the second, the learner relies on patience, objectivity, and careful judgment but would not necessarily take any action in order to reflect on various scenarios and form opinions. The third approach involves using theories and logic rather than feelings to understand problems/situations, relying on a more systemic approach. Lastly, in active experimentation the learner takes a practical approach and is concerned with what really works, as opposed to simply watching a situation.

Dewey's main contribution to EL was stating that there is an intimate and necessary relation between the process of actual experience and education, in other words that everything occurs within a social environment, and his knowledge should be organized in real life experiences that provide a context for such information. His theory of learning relies on exploring various possibilities and utilizing the imagination, which he believed was an integral part of learning and relied on the opportunities provided by teachers in a classroom-based methodology and by experiences obtained in the encompassing social environment. This idea is also known as pragmatism, which rejected the traditional textbook-based style of learning and favored a naturalistic approach in which learners adapted and experienced different environments.

A learner who built upon the work of Dewey, Piaget emphasizes learning as a lifelong process of discovering knowledge, assimilation and accommodation of learning from experience and knowledge, similar to Kolb's later definition of learning being a continuous process. However, despite the many similarities with previous scholars, he also formulates new ideas such as EL having criteria on an individual basis, with an emphasis on age. These new criteria are supported by the 4 stages of cognitive development in children: Accommodation, Divergence, Assimilation, and Converging. While these stages are mainly applicable in psychology, it also has an effect in EL, particularly in the assimilation and accommodation categories. The former allows the learner to witness various scenarios and be able to assign, or assimilate, it to their current knowledge base based on sensory analysis. The latter focuses on the expansion of the knowledge base; i.e. a child being hands on with a dolphin for the first time and accommodating the experience into its knowledge base.

Schon worked with Kolb in developing stage-based theories for EL, with his own contributions leading to 3 pillars in his work based on EL: The Learning Society, Double-Loop Learning, and Reflection In Action. The first is based on a broad spectrum of the world, with Schon believing that learning should extend beyond a formal classroom-style approach in order to create a highly-educated society that is better equipped to combat injustices. The second is more focused on EL, as it is defined as the practice of learning through your mistakes, in particular questioning governing variables themselves, to subject them to critical scrutiny. This they describe as double-loop learning. Such learning may then lead to an alteration in the governing variables and, thus, a shift in the way in which strategies and consequences are framed. Lastly, Reflection In Action has two types of reflections; in-action and on-action, with the former described as "thinking on our feet". It involves looking at our experiences, connecting with our feelings, and attending to our theories in use. The latter is done after the event/action. Workers may write up recordings, talk things through with a supervisor and so on. The act of reflecting-on-action enables us to spend time exploring why we acted as we did, what was happening in a group and so on.

1.3 Growth of Experiential Research Over Time

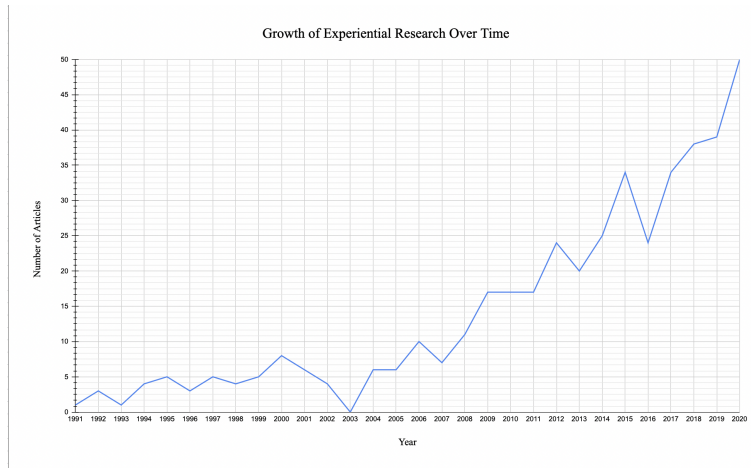


Fig. 1. Quantitative EL Growth [28]

1.4 Primary Experiential Learning Researchers

1.5 Kolb's Contribution

The modern theory of EL is shaped by Kolb's work. Kolb's work draws heavily on Dewey, Lewin, Piaget, and Schon (Kolb 1984). He viewed learning as a continuous process. According to Kolb, learning is not a process that begins and ends when an instructor deposits knowledge into the blank slate of a student. Instead, learning is an ongoing process in which experience continuously modifies pre-existing concepts (Kolb 1984). Kolb proposed a four stage cycle for learning.

Kolb's experiential learning cycle consists of: concrete experiences, reflective observation, abstract conceptualization, and active experimentation.

Concrete Experience The concrete experience stage of Kolb's learning cycle is the most salient amongst ELA. It involves a first hand experience with the subject of learning that often challenges a learner's preconceived.

Reflective Observation When the learner reflects on the new experience in the light of their existing knowledge. Of particular importance are any inconsistencies between experience and understanding, as the bridge between both are necessary to the individual's understanding of such events and drawing subsequent connections.

Abstract Conceptualization and Active Experimentation

The other two stages of abstract conceptualization and active experimentation are often neglected and are more focused upon child cognitive functions rather than experiential learning as a whole.

1.6 Dewey's Contribution

Dewey was the bedrock to Kolb's definition of EL, stating that there is an intimate and necessary relation between the process of actual experience and education (SOURCE) His theory of learning relies on exploring various possibilities and utilizing the imagination, which he believed was an integral part of learning and relied on the opportunities provided by the teachers.

Also known as pragmatism, which rejected the traditional textbook-based style of learning and favored a naturalistic approach in which learners adapted and experienced different environments.

1.7 Piaget's Contribution

Emphasizes learning as a lifelong process of discovering knowledge, assimilation and accommodation of learning from experience and knowledge. Elaborates on previous scholars such as Dewey by taking a longer timeline for EL He is also the first to consider EL based on criteria for individuals, especially age. This theory was extended by his 4 stages of cognitive development for children, which mixed with his theories of EL, particularly assimilation and accommodation.

1.8 Schon's Contribution

Made contributions to EL through multiple theories, with two of them becoming pillars of his work.

The Learning Society Not really contributing to EL, but advances the notion that an educated society is necessary in order to combat injustices.

The Double-Loop Learning The practice of learning through your mistakes, in particular questioning governing variables themselves, to subject them

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Fig. 3. Matrix Review Example [28]

- Neon Yellow - Requires additional help
- Burgundy - Experiential Learning Tool Development
- Red - Not Useful/No experiment

2.2 Further Analysis

Based upon the color schemes shown above, it was essential to keep track of who was analyzing what data in order to get as many perspectives upon such abstract thoughts, as EL varies from person to person and is what we seek to change and result in a more concrete definition. Going down the list, we recognize bad ELA examples as not providing adequate scenarios, pre/post tests, and other qualitative methodology that is not applied per article. For bad science - methodology, it is simply skipping over stages of experimental design that apply to most, if not all, experiments regardless of whether they are qualitative or quantitative in study. Listed below are examples of articles with bad ELA measures, as well as good ELA measures drawn directly from the 433 data points.

Bad ELA:

1. Garner Parker 2016 Service-learning linking family child care providers, community partners, and preservice professionals, uses theoretical methodology.
2. The educational philosophies of John Dewey, Edgar Dale, and Jerome Bruner asserted that experience is essential to the learning process through assertions, not activities.
3. Ranchhod, Gurau, Loukis; evaluating the educational effectiveness of simulation games through an improper value generation model.

Bad Science - Methodology:

1. Efficacy of an International Exchange Via the Internet, that does not use pre and post test surveys to analyze the Internet as a catalyst
2. A graduate course in work site health promotion for occupational health practitioners describes the rationale, teaching strategies, outcomes, and a 6-month follow-up of an academic course.
3. Natural disasters, such as Hurricane Harvey, can provide unique hands-on learning experiences for nursing students. Does not have consistent activities or duties.

Good ELA:

1. Jabarullah Hussain: The effectiveness of problem-based learning in technical and vocational education in Malaysia with a clear ELA defined throughout paper.
2. Seow, Pan, Koh: Examining an experiential learning approach to prepare the impact of an Optional Experiential Learning (OLA) with experiences.

Good Science - Methodology:

1. Seow, Pan, Koh: Examining an experiential learning approach to prepare students for the volatile, uncertain, complex and ambiguous (VUCA) work environment.
2. Valenzuela, Jerez, Hasbun: Closing the gap between business undergraduate education and the organisational environment through clear procedural steps.

2.3 Other Data Analysis Takeways

- **5** use Cite Kolb, **88** cite Dewey in the abstracts (not whole articles)
 - A majority of articles credit Kolb or Dewey, however, the dedication to an established theory of EL varies.
 - A minority of articles map out their activities completely to a definition of EL. Shields et. al (2011) includes an ELA in which an instructor guides the participants through all four stages of Kolb's EL cycle.
 - A number of articles selectively include certain aspects of EL in their activities. Parker et. al (2009) involve both concrete experience and reflective observation in their ELA. Watters et. al (2015) similarly includes at least the first two stages of Kolb's EL cycle. Wick et. al (2019) notably has one experimental group that only participates in the first stage, and a second experimental group that participates in both stages.
 - A large portion of articles reduce EL to the "direct experience", excluding other aspects of EL and drawing no clear connection between EL and the activity. Simmons et. al (2004) describes an ELA that consists of a standalone experience. The same can be said of Ozen (2015) and Wick et. al (2019).
 - Many activities can be intuitively interpreted as experiential. There are no specific standards that an activity must meet in order to be considered EL.

Such other takeaways also play an important role in our understanding of EL, as we are able to draw and connect patterns between various articles that differ in a variety of ways, from publish date, authors, intended field of study, etc. Through such a variety of scenarios and purposes, we are able to draw parallels such as the ones that directly mention the regarded pioneers of EL, Dewey and Kolb, as well as taking a more abstract approach using the abstracts to determine whether the scenarios in question were "Direct Experiences", meaning that it focused directly on EL without focusing on background knowledge or other related aspects, or whether it took an "Indirect Experiences" approach in order to qualitatively understand EL and its surrounding factors in an effort to establish a more intimate connection between the activity and the resulting learning experience that occurred. Likewise, qualitative methodology leads in terms of usage, and quantitative does not lag behind either. However, quantitative is almost on par with mixed methods in terms of usage as well, which is a combination of qualitative and quantitative and is not counted as part of either solely quantitative or qualitative. Lastly, this means that articles utilize both qualitative and quantitative approaches, as well as a mixture of both. Review and conceptual are the least used, with review being secondary sources as mentioned above and conceptual being hypothetical activities/scenarios. These connections and patterns therefore enhance our overall understanding and are a byproduct of the main criterion that we have established as shown in Fig. 1 above.

3 Comparison Between Evaluation Criteria

3.1 Pros and Cons for Review Criterion

Experiential Categories	Pros	Cons
Project-Based Learning	One of the most common EL activity categories found across our database of 433 articles: highest usage of pre and post-tests and connected EL to activity at hand.	High possibility of misdirecting EL in group settings into achieving unequal results, or simply not applying on an individualistic basis.
Classroom-based Learning	Applicable across most grade levels, from primary education to the graduate level, and is the most common real-life scenario based.	Has various activities that are hard to qualitatively measure, therefore most of the articles utilize a quantitative-only methodology.
Program-based Learning	Allows the measurement of EL effectiveness on older age groups in particular, allowing us to hone our definitions.	Quite similar to project-based learning, therefore it is hard to differentiate between the two although it is necessary to differentiate.
App-based Learning	Has high potential to be used as the most common form of EL in the future: articles focused most upon its future applications compared to other learning styles.	Least used across all of our article databases, is hard to interact with in a hands-on mode until recently due to the advent of technology.
Survey-based learning	Contains metrics for categories such as understanding, critical thinking measures, and other important qualitative and quantitative assessors.	Often resulted in a disconnect between EL and the actual activity at hand, leading to more of a hypothetical scenario.

3.2 Our Defined Experiential Learning Criteria

The criteria as defined for the experiential learning articles consist of a mixture that utilizes the categories presented in the table above as well as other aspects that contribute to the overall definition that we analyze throughout our data. We combined all of the mentioned criteria in the table above, creating an intricate criteria that quantitatively and qualitatively measures each article using standard metrics (i.e. the p-values generated between the quantitative survey measures). Going in-depth into our fundamentals, we utilize this along with the aforementioned colored criteria in order to create a lattice framework that analyzes all articles from a combined methodology perspective after grouping them in their respective categories as listed above. Recognizing that the criterion are tied together in some form, we assess each criterion on its own, however, we combine them all together in order to clearly evaluate the experiential learning conclusions and procedures undertaken in our database of 433 articles through subjective and objective measures as described in the next paragraph to gain the most intimate understanding of the processes involved.

Although a minority of articles assess using objective measures, the overwhelming majority use subjective measures. In other words, we measure the experiences of people based on their feedback as well as observations throughout various scenarios. This means that articles utilize both qualitative and quantitative approaches, as well as a mixture of both. Review and conceptual are the least used. Qualitative leads in terms of usage, and quantitative does not lag behind either. However, quantitative is almost on par with mixed methods in terms of usage as well, which is a combination of qualitative and quantitative and is not counted as part of either solely quantitative or qualitative. Most effective articles have been noted to include a pre and post evaluation of some kind, whether it be qualitative measures (such as interviews) or quantitative (criteria that evaluates using numbers such as a multiple-choice test). While the pre and post tests may differ in terms of how they are given/assessed, in most scenarios we see that the pre and post tests are kept the same, at least format-wise, in order to make comparisons as easy as possible.

4 Impact and Legitimacy of Experiential Learning

4.1 Learning as a Process, not Outcomes

Kolb's theory of experiential learning has a distinct relationship with measuring educational outcomes. According to Kolb, learning can be viewed as a process that transforms the learner. This is in opposition to the "banking" concept of education, in which teaching is viewed as depositing new knowledge into a student. The relationship between new knowledge and pre-existing schemas is not reflected in this analogy

The emphasis on the process of learning as opposed to the behavioral outcomes distinguishes experiential learning from the idealist approaches of traditional education and from the behavioral theories of learning created by Watson, Hull, Skinner, and others. The theory of experiential learning rests on a different philosophical and epistemological base from behaviorist theories of learning and idealist educational approaches. Modern versions of these latter approaches are based on the empiricist philosophies of Locke and others. This epistemology is based on the idea that there are elements of consciousness- mental atoms, or, in Locke's term "simple ideas"- that always remain the same. The various combinations and associations of these consistent elements form our varying patterns of thought. It is the notion of constant, fixed elements of thought that has had such a profound effect on prevailing approaches to learning and education, resulting in a tendency to define learning in terms of its outcomes, whether these be knowledge in an accumulated storehouse of facts or habits representing behavioral responses to specific stimulus conditions. If ideas are seen to be fixed and immutable, then it seems possible to measure how much someone has learned by the amount of these fixed ideas the person has accumulated.

Experiential learning theory, however, proceeds from a different set of assumptions. Ideas are not fixed and immutable elements of thought but are formed and re-formed through experience. In all three of the learning models just reviewed, learning is described as a process whereby concepts are derived from and continuously modified by experience. No two thoughts are ever the same, since experience always intervenes. Piaget (1970), for example, considers the creation of new knowledge to be the central problem of genetic epistemology, since each act of understanding is the result of a process of continuous construction and invention through the interaction processes of assimilation and accommodation (compare Chapter 5, p. 99). Learning is an emergent process whose outcomes represent only historical record, not knowledge of the future. When viewed from the perspective of experiential learning, the tendency to define learning in terms of outcomes can become a definition of nonlearning, in the process sense that the failure to modify ideas and habits as a result of experience is maladaptive. The clearest example of this irony lies in the behaviorist axiom that the strength of a habit can be measured by its resistance to extinction. That is, the more I have "learned" a given habit, the longer I will persist in behaving that way when it is no longer rewarded. The separation of EL from this traditional approach to education can explain the alternative methods used to measure outcomes. Similarly, there are those who feel that the orientations that conceive of learning in terms of traditional settings, whether hypothetical in the face of new techniques such as active recall, make experiential learning a legitimate tool that must be utilized to draw upon experiences and continue to make learning a process rather than focus on the outcomes in the short term that ultimately resolve the rewards offered in the long run.

- What should be taught, why it is important, and how this knowledge should be organized (knowledge-centeredness)
- Who learns, how, and why (learner-centeredness)
- What kinds of classroom, school, and school-community environments enhance learning (community-centeredness), and
- What kinds of evidence for learning students, teachers, parents, and others can use to see if effective learning is really occurring (assessment-centeredness).

Fig. 4. HPL Framework (Bransford (1994) [27])

4.2 Identified Data Frameworks

In our research methodology, we used an inductive approach with an initial objective to understand what experiential learning is and how it is measured in the post-secondary learning environment. To answer this initial research question, we first performed a Web of Science search: we searched in the Web of Science Core Collection for English-language articles published between 1990 and 2020 that included the search terms 'experiential learning 'and 'university 'or 'college 'in the article title, abstract, or topic. This left an initial sample of 448 primary source articles. After downloading the abstracts and bibliographic information of all 448 articles, we coded these for empirical approach (e.g., qualitative, quantitative, or mixed methods), discipline (e.g., engineering), context (e.g., undergraduate classroom), and experiential learning approaches (e.g., project-based, simulation, internship, etc.). This process was inductive, and categories were added or combined as we moved through the process (e.g., management and accounting disciplines could be combined under 'business '). We excluded those articles that had no indication of having performed empirical research related to experiential learning (e.g., literature reviews and theory papers). An example of one of the articles we excluded from our final data set is Building and Sustaining Community-University Partnerships in Marginalized Urban Areas, which explores and examines the challenges and opportunities of building community-university collaborations in marginalized urban areas. The selection of short essays highlights different experiences of building and sustaining community-university partnerships in a variety of cities as vehicles for enhancing experiential learning in geography, urban studies, and cognate disciplines. This initial culling left us with a total of 433 empirical papers (qualitative or quantitative methods of any type) for analysis. We downloaded the full-text .pdf of all of these papers for further analysis. As we read, we noticed little standardization within research methodologies and results reporting, even where similar experiential learning approaches were used (e.g., across 'internships '). This led us to hone in on only papers using quantitative methods, which we coded definition of experiential learning, independent and dependent variables, presence of a con-

trol group and/or pre- and post-tests, what the 'experience 'entailed, and key findings.

5 Conclusion

In general, experiential learning is based upon the process of learning through experience. This research project as a whole intended to explore each and every aspect of experiential learning, whether from a qualitative, quantitative, and mixed methodologies approach, and properly determine a concrete definition of experiential learning. While utilizing experiments done and other scenarios relating to experiential learning found through private databases and data collected on the behest of Dr. Sarah Wittman, **it is important to note that this research project does not fit under the category of being a literature review.** It is important to identify just as we identified in the Data Frameworks section above that we excluded theoretical and literature review-esque data, with all of our data being sourced at George Mason University and being given by Dr. Sarah Wittman to Utkarsh Bansal, the primary author of this research paper, and following all IRB and other regulatory guidelines.

Through the data, we coded a definition of experiential learning, independent and dependent variables, presence of a control group and/or pre- and post-tests, what the 'experience 'entailed, and key findings. Utilizing such cross patterns that developed out of plugging in our data into common criterion that we developed in order to break the data into equally-smaller parts in order to understand and analyze them on a micro level. Out of such data, we were able to condense experiential learning into being based upon 3 pillars, **Experience, Background (Prior) Knowledge, and Learning Knowledge Type.** Such 3 pillars are defined in detail above, and came directly as a result of our primary data from which we implemented the procedures described through out this research paper and through the categories described in the Section 3.1 table. Therefore, we came to the concluding definition that experiential learning as a whole can be defined as building upon background knowledge using experiences that are directly hands-on and measure the increase in your knowledge before and after the experience at hand through reflection and analysis in real-time.

By determining a concrete definition for experiential learning, this research project will provide a benchmark that has not been available in the field of behavioral and social sciences previously. Such a benchmark through a clear definition will allow other researchers to determine whether scenarios or articles fit the criteria to be evaluated as an experiential learning setting as well as design experiments that better reflect experiential learning as a whole. Whether from a qualitative or quantitative viewpoint, having a defined version of experiential learning based on the data gathered also allows the creation of programs and projects that reflect this definition and allow the implementation of this novel learning style in the real world as well. While such benefits would require

educators and cognitive scientists to further study the implications of experiential learning and recognize how to best implement it on a large scale basis, the numerous benefits gained from utilizing a hands-on approach that encourages reflection and pre/post-analysis compared to traditional forms of learning would benefit a large part of the population through a more effective learning process.

References

1. @mischayles₂₀₁₉, title = *InspireSustainabilityInternships : Promotingcampusgreeninginitiatives* <https://www.emerald.com/insight/content/doi/10.1108/IJSHE-03-2019-0111/full/html>, journal = *InternationalJournalofSustainabilityinHigherEducation*, publisher = EmeraldPublishingLimited, author = Hayles, CarolynSusan, year = 2019, month = May
2. @miscralph, e., walker, k., amp; wimmer, r. (2009). *practicum-education ...*, url=https://www.researchgate.net/publication/257576236_RalphEWalkerKWimmerR2009Practicum-education_experiencesPost-interns
3. @misc(pdf) strengthening sustainability leadership competencies through ..., url=https://www.researchgate.net/publication/323717986_strengthening_sustainability_leadership_competencies
4. @miscstansbie_{nashchang}1970, title = *LinkinginternshipsandClassroomLearning : ACaseStudyExam* <https://www.semanticscholar.org/paper/Linking-internships-and-classroom-learning>
5. @mischttps://pubmed.ncbi.nlm.nih.gov/15236813/, journal=Addictive behaviors, publisher=U.S. National Library of Medicine, author=TH;; Simmons VN;Webb MS;Brandon
6. @miscwatters al;stabulas-savage j;toppin jd;janal mn;robbins mr; title=Incorporating experiential learning techniques to improve self-efficacy in Clinical Special Care Dentistry Education, url=<https://pubmed.ncbi.nlm.nih.gov/26329025/>, journal=Journal of dental education, publisher=U.S. National Library of Medicine, author=Watters AL;Stabulas-Savage J;Toppin JD;Janal MN;Robbins MR;
7. @miscparker_{myershigginsoddssonprice}2009, title = *Morethanexperientiallearningorvolunteering* <https://eric.ed.gov/?id=EJ870764>, journal = *HigherEducationResearchandDevelopment*, publisher = Routledge. Available from : Tayloramp; Francis, Ltd.325ChestnutStreetSuite800, Philadelphia, PA19106. Parker, ElizabethAnneandMyers, NatashaandHiggins, HelenChristineandOddsson, ThorunandPrice, Me 2009, month = Nov
8. @miscseow_{pankoh}2019, title = *Examininganexperientiallearningapproachtopreparestudentsforthevol* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3300005, journal = *SSRN*, author = Seow, Poh - SunandPan, GaryandKoh, Grace, year = 2019, month = Jan
9. @miscranchhod_{guraoukisirivedi}1970, title = *[PDF]evaluatingtheeducationaleffectivenessofsimula* <https://www.semanticscholar.org/paper/Evaluating-the-educational-effectiveness-of-games>
10. @misclp; title=Capturing readiness to learn and collaboration as explored with an interprofessional simulation scenario: A mixed-methods research study, url=<https://pubmed.ncbi.nlm.nih.gov/26363963/>, journal=Nurse education today, publisher=U.S. National Library of Medicine, author=LP;; Rossler KL;Kimble
11. @miscworking paper series - ceep, url=<https://ceep.mit.edu/wp-content/uploads/2021/09/2020-018.pdf>

12. @misccl; title=Use of simulation for global health pre-departure training, url=https://pubmed.ncbi.nlm.nih.gov/32980609/, journal=Nurse education today, publisher=U.S. National Library of Medicine, author=CL;, Nadeau C;Snowden K;Gattamorta KA;Foronda

13. @miscsteck_e ngler_ligon_druen_c osgrove_2011, title = Doing poverty : Learning outcomes among students, url=https://eric.ed.gov/?id=EJ929884, journal = Teaching Sociology, publisher = SAGE Publications, 2455 Teller Road, Thousand Oaks, CA 91320. Tel : 800 - 818 - 7243; Tel : 805 - 499 - 9774, author = Steck, Laura West and Engler, Jennifer N. and Ligon, Mary and Druen, Perri B. and Cosgrove, Erin, year = 2011, month = Jun

14. @miscauthors_r olvs_jord_a dditional information funding this work was supported by polyfon - knowledge cluster for music therapy, title = Becoming a reflexive practitioner : Exploring music therapy student experiences, url=https://www.tandfonline.com/doi/full/10.1080/00313831.2020.1755723, journal = Taylor & Francis, publisher = George Mason University, author = authors, All and Rolvsjord, Wolfgang S

15. @misczawadzki_a nabe_s hields_2012, title = How to talk about gender inequity in the workplace : Using wage inequality to understand gender inequality, url=https://link.springer.com/article/10.1007/s11199-012-0181-z, journal = SpringerLink, publisher = Springer US, author = Zawadzki, Matthew J. and Danube, Cinnamon L. and Shields, Jennifer, year = 2012, month = Aug

16. @miscje; title=Male nursing students' experiences of simulation used to replace maternal-child clinical learning in Qatar, url=https://pubmed.ncbi.nlm.nih.gov/31706203/, journal=Nurse education today, publisher=U.S. National Library of Medicine, author=JE;, Kennedy DM;Jewell JJ;Hickey

17. @miscparker_m yers_h iggins_o ddsson_p rice_o ould_2009, title = More than experiential learning or volunteering : The role of service learning in higher education, url=https://eric.ed.gov/?id=EJ870764, journal = Higher Education Research and Development, publisher = Routledge. Available from : Taylor & Francis, Ltd. 325 Chestnut Street Suite 800, Philadelphia, PA 19106. Texts on File, author = Parker, Elizabeth Anne and Myers, Natasha and Higgins, Helen Christine and Oddsson, Thorun and Price, Meaghan, year = 2009, month = Nov

18. @miscweiler_l; haddock_s; zimmerman_t s; krafchick_j; henry_k; rudisill_s; title=Benefits derived by college students from mentoring at-risk youth in a service-learning course, url=https://pubmed.ncbi.nlm.nih.gov/23835781/, journal=American journal of community psychology, publisher=George Mason University, author=Weiler L;Haddock S;Zimmerman TS;Krafchick J;Henry K;Rudisill S;

19. @miscsickora_c; salt_rj; page_ts; lee_w; cantu_ag; lee_m; schwab_kw; martinez_ml; byrd_d; title=Evolution of experiential learning opportunities for nursing students after natural disaster, url=https://pubmed.ncbi.nlm.nih.gov/31945172/, journal=The Journal of nursing education, publisher=George Mason University, author=Sickora C;Salt RJ;Page TS;Lee W;Cantu AG;Lee M;Schwab KW;Martinez ML;Byrd D;

20. @miscwikstr_m_2014, title = Nursing education at an art gallery, url = https://www.academia.edu/1978970/Nursing_education_at_an_art_gallery, journal = Journal of Nursing Scholarship, publisher = Wiley Online Library, author = Wikström, Britt - Maj, year = 2014, month = Apr

21. @miscwiley_soil_use_and_management, title=Network-based approaches for Soil Health Research and extension ..., url=https://bsssjournals.onlinelibrary.wiley.com/doi/10.1111/sum.12111, journal=Wiley Soil Use and Management, publisher=George Mason University

22. @miscmroz₁970, title = *Seeing how people hear you : French learnersexperiencingintelligibilitythrough*
<https://experts.illinois.edu/en/publications/seeing-how-people-hear-you-french-learners-e>,
GeorgeMasonUniversityExperimentalDatabases, publisher = *Wiley-Blackwell*, author =
Mroz, AurorePatricia, year = 1970, month = Jan

23. @miscsukys s;cesnaitiene vj;emeljanovas a;mieziene b;valantine i;ossowski zm; title=Reasons and barriers for university students' leisure-time physical activity: Moderating effect of Health Education, url=https://pubmed.ncbi.nlm.nih.gov/31407961/, journal=Perceptual and motor skills, publisher=George Mason University, author=Sukys S;Cesnaitiene VJ;Emeljanovas A;Mieziene B;Valantine I;Ossowski ZM;

24. @miscstewart_s,antiago₁970, title = *Usingtheliterarytexttoengagelanguagelearnersinamultilingualcom*
<https://www.semanticscholar.org/paper/Using-the-Literary-Text-to-Engage-Language-Learners-in-Multilingual-LinguisticChannels>, publisher = *GeorgeMasonUniversity*, author = *Stewart, J.andSantiago, Karen*, year = 1970, month = Jan

25. @miscsukys s;cesnaitiene vj;emeljanovas a;mieziene b;valantine i;ossowski zm; title=Reasons and barriers for university students' leisure-time physical activity: Moderating effect of Health Education, url=https://pubmed.ncbi.nlm.nih.gov/31407961/, journal=Perceptual and motor skills, publisher=U.S. National Library of Medicine, author=Sukys S;Cesnaitiene VJ;Emeljanovas A;Mieziene B;Valantine I;Ossowski ZM;

26. @miscsciencedirect.com | science, health and medical journals, full text articles and books., title=Explore scientific, technical, and medical research on ScienceDirect, url=https://www.sciencedirect.com/, journal=ScienceDirect.com | Science, health and medical journals, full text articles and books.

27. @miscsth; title=College-student smoking: An initial test of an experiential dissonance-enhancing intervention, url=https://pubmed.ncbi.nlm.nih.gov/15236813/, journal=Addictive behaviors, publisher=U.S. National Library of Medicine, author=TH;, Simmons VN;Webb MS;Brandon

28. @miscvosniadou₂021, title = *Towardsarevisedcognitivepsychologyfornewadvancesinlearningandinstruction*
https://www.academia.edu/48524615/Towards_a_revised_cognitive_psychology_for_new_advances_in_learning_and_instruction, publisher = *ElsevierBV(GMU)*, author = *Vosniadou, Stella*, year = 2021, month = May

29. @miscgoldstein₂018, title = *Cognitivepsychology : Connectingmind, research, andeverydayexperience*
https://books.google.com/books/about/Cognitive_Psychology_Connecting_Mind_Res.html?id=vmRwEAAAC, publisher = *CengageLearning*, author = *Goldstein, E.Bruce*, year = 2018, month = Jul

30. @miscduit_t, reagust₁970, title = [PDF]*ConceptualChange : Apowerfulframeworkforimprovingscienc*
<https://www.semanticscholar.org/paper/Conceptual-change>

31. @miscsfard₁998, title = [PDF]*ontwometaphorsforlearningandthedangersofchoosingjustone : Seman*
<https://www.semanticscholar.org/paper/On-Two-Metaphors-for-Learning-and-the-Dangers-of-Choosing-Just-One>, author = *Sfard, A.*, year = 1998, month = Jan

32. @miscduit_t, reagust₁970, title = *Conceptualchange : Stillapowerfulframeworkforimprovingthepracti*
https://link.springer.com/chapter/10.1007/978-94-007-3980-2_4, journal = *SpringerLink*, publisher = *SpringerNetherlands*, author = *Duit, ReindersH.andTreagust, DavidF.*, year = 1970, month = Jan

33. @misckolb_{ublin_spoth_baker}1986, title = *Strategic Management Development : Using Experiential Learning*,
[https://www.semanticscholar.org/paper/Strategic – Management – Development](https://www.semanticscholar.org/paper/Strategic-Management-Development)
34. @misc_{kayes_hegeorgewashingtonuniversitysearchformorepapersbythisauthor_b.c.g.p.l.e.b.e.etal.}2017, title = *Experiential learning and its critics : Preserving the role of experience in Management Learning and Education*,
<https://journals.aom.org/doi/10.5465/amle.2002.8509336>, journal = *Academy of Management Learning and Education*,
 Kayes, D. Christopher and The George Washington University Search for more papers by this author and B., Aggregating,
 2017, month = Nov
35. Steck, Engler, Ligon 2011 Doing Poverty Learning Outcomes among Students Participating in the Community Action Poverty Simulation Program.pdf
36. @misc(pdf) experiential learning: experience as the source of learning and ... , url=[https://www.researchgate.net/publication/315793484_Experiential Learning Experience as the source of learning](https://www.researchgate.net/publication/315793484_Experiential_Learning_Experience_as_the_source_of_learning)
 George Mason University
37. @miscinternet archive₁₉₉₁, title = *The reflective practitioner : Donald A. Schon : Free download, borrow, and streaming*,
<https://archive.org/details/reflectivepracti00scho>, journal = *Internet Archive*, publisher = Avebury GMU, year = 1991, month = Jan
38. @miscchow₂₀₁₄, title = *How we think (Dewey 1933)*, url = [https://www.academia.edu/1748275/How we think](https://www.academia.edu/1748275/How_we_think)
39. @miscinternet archive, title=Experience and education : John Dewey : Free download, borrow, and streaming, url=<https://archive.org/details/ExperienceAndEducation>, journal=Internet Archive, publisher=George Mason University
40. @miscmcleod₁₉₇₀, title = *[Kolb's learning styles and experiential learning cycle]*, url = [https://www.simplypsychology.org/learning – kolb.html](https://www.simplypsychology.org/learning-kolb.html), journal = *Simply Psychology*, author = Mcleod, [Saul, year = 1970, month = Jan
41. @misctheories of learning and their role in teaching | request pdf, url=[https://www.researchgate.net/publication/315793484_Theories of learning and their role in teaching](https://www.researchgate.net/publication/315793484_Theories_of_learning_and_their_role_in_teaching)
 GMU
42. @miscsfard₁₉₉₈, title = *[PDF] On two metaphors for learning and the dangers of choosing just one : Semanticscholar*,
[https://www.semanticscholar.org/paper/On – Two – Metaphors – for – Learning – and – the – Dangers – of – Choosing – Just – One](https://www.semanticscholar.org/paper/On-Two-Metaphors-for-Learning-and-the-Dangers-of-Choosing-Just-One),
 undefined, publisher = George Mason University, author = Sfard, A., year = 1998, month = Jan
43. @misczawadzki_{danube_shields}, title = *How to talk about gender inequality in the workplace : Using wages as a metaphor*,
[https://pennstate.pure.elsevier.com/en/publications/how – to – talk – about – gender – inequality – in – the – workplace](https://pennstate.pure.elsevier.com/en/publications/how-to-talk-about-gender-inequality-in-the-workplace),
 Penn State, publisher = George Mason University Experimental Databases, author = Zawadzki, Matthew J. and Danube, Cinnamon L. and Shields, Stephanie A.