

REALIZING A DISCIPLINARIAN STATE OF BEING FROM AN INTERDISCIPLINARY APPROACH OR AN INTERDISCIPLINARIAN STATE OF BEING FROM DISCIPLINES

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ABSTRACT

An interdisciplinarian is a focusedly learned individual who has had both additional expert tutelage and “synergetic knowledge connections,” resulting in the latter from convolvement learning of comparative and contrasting information and methods. Secondly, to be a multidisciplinarian is to be knowledgeable in two or more disciplines without having had the benefits of expert tutelage or “synergetic knowledge connections.” Thirdly, a disciplinarian is a focusedly learned individual possessing vast amounts of related information and understanding in a single field of study, resulting from additional expert tutelage, thus allowing the individual to be able to investigate new concepts, serve an organization, solve new problems, or make new products. This same ability to investigate new concepts, serve an organization, solve new problems, and make new products exists for the interdisciplinarian as well, but far less so if at all for the multidisciplinarian individual.

These three vastly different states of being are what we call in this research Career-path Alliances. Each Career-path alliance can manifest through opportunities where an individual can persist by doing scholarly activities on one hand, or serving organizations, practicing professional activities, or entering early career choice positioning on the other. How to achieve a Career-path alliance and sustain the same is an interesting contemplation. To that extent, we have reviewed the Career-path alliances and illustrated here seven structures that illumine timelines to achieve such states of being. Also, along with providing critical information on issues pertaining to achieving each Career-path alliance, particularly regarding socioeconomics of different groups of individuals, we denote how to maintain or persist in each alliance once achieved, and how to transition from one alliance to another, while still maintaining a scholarly demeanor, a servicing posture, a professional practicing behavior, or an early career choice participation stance after either the interdisciplinarian or disciplinarian alliance has been achieved.

1. INTRODUCTION

Originating from since the early days of formalized degree-granting universities, the notion of learning sufficiently to be a disciplinarian with a specific degree has been the desired as well as the only end-result state of being available to aspiring graduates [1]-[4]. And as such, this initial state of being, this Career-path alliance, as we refer to it, has become the standard and has persisted continuously as such, as the accepted norm. But of late, beginning in the early-middle part of the 20th century and continuing to this point, the notion of becoming an interdisciplinarian has gained considerable attention, which offers an interesting alternative to being a disciplinarian [1], [5]-[12]. Through its style of expression, with a growing group of advocates and stakeholders, the interdisciplinarian state of being is considered by some to be just as viable if not more so than that of being a disciplinarian. Moreover, with these two indicated alliances, one could be inclined to think that the co-existence of both disciplines and interdisciplines is without complication or complexity, and that each is accepting of the other, respectively, by its advocates and stakeholders. Yet, such thinking is simply not true as rivalries and mistrust abound between the two opposing factions.

In addition, another component to this mix is what of being a multidisciplinarian, the individual who by definition is familiar with several disciplines. Our research and that of others have shown that the multidisciplinarian state of being [1, 13] is the least viable one for competency when compared to the disciplinarian or interdisciplinarian state, and as such, an individual should persist only briefly as a multidisciplinarian and strive mightily to transition to either a disciplinary or interdisciplinarian state of being

at the first opportunity. Otherwise, such a person remains effectively trapped in what could be a minimally productive, lesser rewarding, and essentially a stymied participatory state of being.

Additionally, in this research, each of the three end-products or state of being—interdisciplinary, disciplinarian, and multidisciplinary—is discussed independently as separate Career-path alliances; and, although extensive literature presently exists on each individual Career-path alliance [14]-[16], not so much exist on transitional pathways between the alliances. Thus, how does one transition from one state of being to another is a desired outcome, and we present below in section 2 methods of such transitions. In addition, while understanding relevant patterns of early career choice positioning, professional practices, servicing routines, or scholarly endeavors is as important now in this the 21st century, if not more so than ever it was at any point in the past, acquiring an understanding of either pattern is obscured thus requiring greater effort to unfurl its intricate details, and pursuing the task of achieving one pattern in a specific Career-path alliance demands constant attention and focused effort. In this regard, we show in section 2 below the steps or components of achieving each Career-path alliance as well as, how to transition from one to another. Also, regarding the disciplinarian and interdisciplinary alliances, we present well established documented disciplines and interdisciplines that will significantly impact our lives in this the 21st century and beyond.

2. METHODS: CAREER-PATH ALLIANCES (STATES OF BEING) AND TRANSITIONS

2.1. The Disciplinarian

In Figure (2a), the leftmost box shows the typical and expected training required for embarking onto a successful career opportunity as a disciplinarian. The disciplinarian’s training before college consists of any and all parts of formal studies: pre-K, kindergarten, primary, elementary, junior high school, and high school. Next, this box depicts college/university training resulting in the B.A./B.S. degree followed by the M.A./M.S., Ph.D., or equivalent degrees, and finally a Post-doc experience. Lastly, the box shows expert tutelage as the first part

of directed learning. Any or all of these training activities are desired or needed to achieve various states of being.

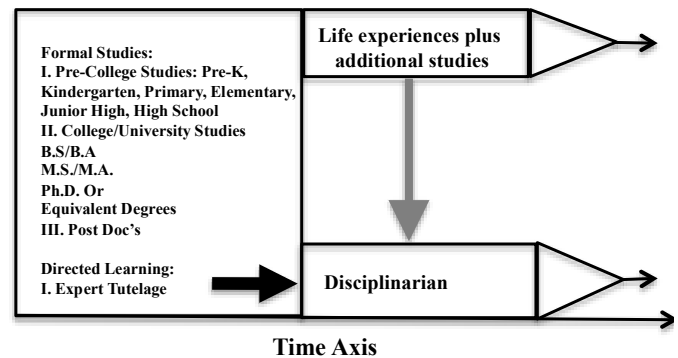


Figure (2a) Direct Disciplinarian diagram

Moreover, with these levels of training, the Figure shows that the individual is equipped to enter the realms of being a disciplinarian, with its rightmost top box expressing life experiences plus additional studies that serve to provide enhancement and sustaining “fodder” or “knowledge nutrients” to this individual who functions as a disciplinarian. Note that this structure remains applicable to all individuals who enter the workforce either as an early career choice position, a service providing position, a professional practicing position, or a scholarly endeavor activity. The horizontal axis indicates the time and as such represents an unspecified time for achieving and then sustaining the desired Career-path alliance, which in this case is that of the disciplinarian. An individual can persist in this alliance through his/her career lifetime if that is their desire. The rightmost two boxes stacked vertically with an intervening directional arrow depict a continuum and an indefinite pursuit with time being shown on the horizontal axis. As stated earlier, this disciplinarian structure is the standard or norm; it is the one that is expected and what is typically embraced as the ideal structure to obtain for either the career choice position, the service providing position, the professional practice position, or the scholarly endeavor activities. In this regard, impactful disciplines in the 21st century and closely related fields to our interests are: Physics [17,18], with two related papers, Chemistry, Mathematics, Biology, Electrical Engineering, and Mechanical Engineering.

2.2. The Interdisciplinary

Figure (2b) illustrates the direct pathway of becoming an interdisciplinary. As was the case in Figure (2a), the essential, formal studies are obtained plus the additional requisite activities of directed learning, consisting now of both expert tutelage and convolvement learning. This figure indicates the process of emerging interdisciplinarity early career choices, servicing routines, professional practices or scholar endeavors. In addition, the life experiences plus additional studies continue to enhance the direct interdisciplinary with no regard to termination. No doubtedly many existing interdisciplinarians have followed this pathway to their present positions; moreover, many active interdisciplinarians exist or engage as interdisciplinarian by first formally securing career stability or job security as disciplinarians, and then actively operating as an interdisciplinary.

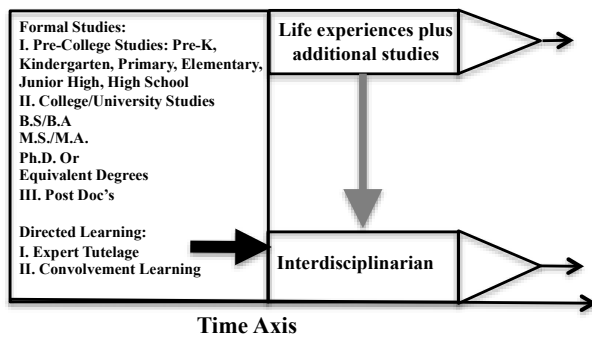


Figure (2b) Direct Interdisciplinary diagram

In this regard, several important interdisciplinary areas or fields that are of interest to us, while not being exhausted, are: Materials Science [19, 20], with two related papers, Biomedical Engineering, Biochemistry, Biophysics, and Information Technology.

2.3. The Multidisciplinary

What are the issues and particulars to being a multidisciplinary? First and foremost, being a multidisciplinary should not be thought of as an end Career-path alliance within itself, although it often occupies a large part of some individuals' existence. In this regard, some individuals find themselves persisting in what might be called a knowledge wasteland, manifesting as being a lower form of the "Jack of all trades, master of none" syndrome. Yet, being a multidisciplinary, as will be shown later, is

an integral part of Career-path alliances to becoming a bona fide interdisciplinary or a disciplinarian, as well, through the transition pathways. Thus, in Figure (2c), components for being a multidisciplinary are given primarily as a passing through activity rather than as components of a position to achieve as the culmination at the end of a Career-path alliance. Once again, as Figure (2c) shows all the initial formal studies occur, as for the case of the above disciplinarian or interdisciplinary, with the addition of life experiences plus additional studies. Yet, for whatever reason and the causes are many and varied, either the expert tutelage, which is now missing in the leftmost box did not occur for this individual to emerge as a bona fide expert in his/her chosen area of interest or it has not been obtained from the topmost box denoting the continuum of life experiences and additional studies. In addition, as for as being an interdisciplinary, no synergetic convolvement has occurred either, which existed as a prerequisite in Figure (2b). Although the multidisciplinary is often learned with vast knowledge in some cases, ultimately the individual's training has not led to having convolved synergetically between components of his/her knowledge. Thus, this individual remains unfocused and rather incompetent in today's workforce; he/she is ill-equipped to function in an early career-choice position, a service providing position, a practicing professional position, or in a scholarly endeavor.

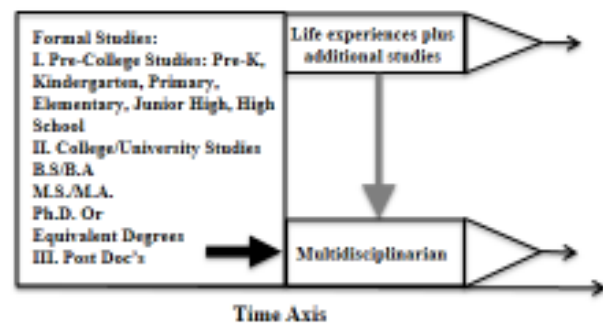


Figure (2c) Direct Multidisciplinary diagram

2.4. The Interdisciplinary From a Multidisciplinary

In above section 2.2, Figure (2b) illustrates the Career-path alliance of becoming an interdisciplinary directly from formal studies and directed learning, occurring as the leftmost box

indicates; however, Figure (2d), below, which is an extension of Figure (2c), depicts the method of becoming an interdisciplinarian from first being a multidisciplinarian. Here, Figure (2d) indicates the process of extending a multidisciplinarian's development and understanding with expert tutelage and synergetic convolvement, resulting in the emergence of an interdisciplinarian in any of the four stages, as a career choice position individual, a service providing position, a professional practicing position or scholarly endeavors. Now, the inclusion of expert tutelage plus convolvement learning in Figure (2d) allows an individual to emerge as an interdisciplinarian. Undoubtedly many existing interdisciplinarians have followed this pathway to their present positions; however, many active interdisciplinarians exist, as such, by formally securing career stability or job security as disciplinarians but functions as an interdisciplinarian.

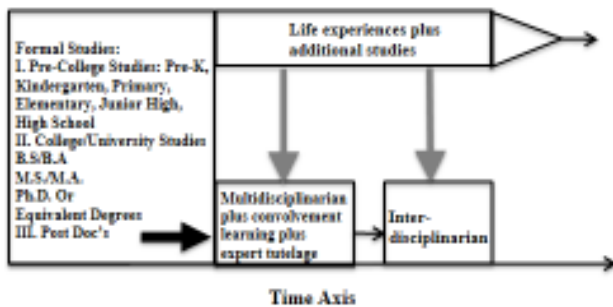


Figure (2d) Direct Transition to Interdisciplinarian

2.5. The Disciplinarian From a Multidisciplinarian

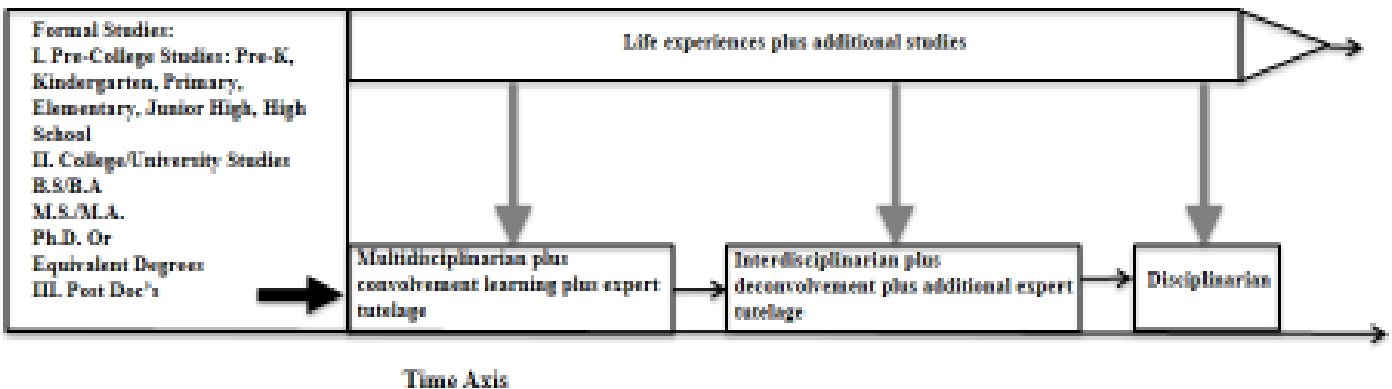


Figure (2f) Indirect Transition to Disciplinarian Through Interdisciplinarian State

Here, the corresponding question is often asked of how to become a disciplinarian from the position of first being a multidisciplinarian. As in the case for emerging as an interdisciplinarian, Figure (2e) shows that the individual must receive the additional expert tutelage while being a multidisciplinarian, thus ending the multidisciplinarian state of being and concomitantly transitioning into a single, cohesive disciplinarian, as now this functioning individual would be.

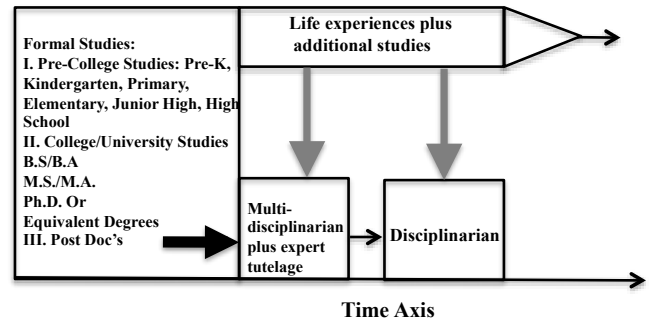


Figure (2e) Direct Transition to Disciplinarian

2.6. The Disciplinarian From an Interdisciplinarian

Figure (2f) shows the indirect transition to being an interdisciplinarian from the previous states of being a multidisciplinarian to a disciplinarian as the final state of being. The middle bottommost box indicates the stage of deconvolving from being an interdisciplinarian. Thus, this indirect transition is one of the most likely Career-path alliances to becoming a disciplinarian through the Interdisciplinary pathway.

2.7. The Interdisciplinary From a Disciplinarian

Figure (2g) ends in the establishment of an interdisciplinary from a disciplinarian. This second indirect transition ensues as the other one does, beginning with formal studies and progressing onto becoming a multidisciplinary. Then, the

multidisciplinary combines the experiences and activities of expert tutelage resulting in a disciplinarian state of being. Lastly, the individual combines convolvement learning, which yields the indirect transition to the interdisciplinary state of being.

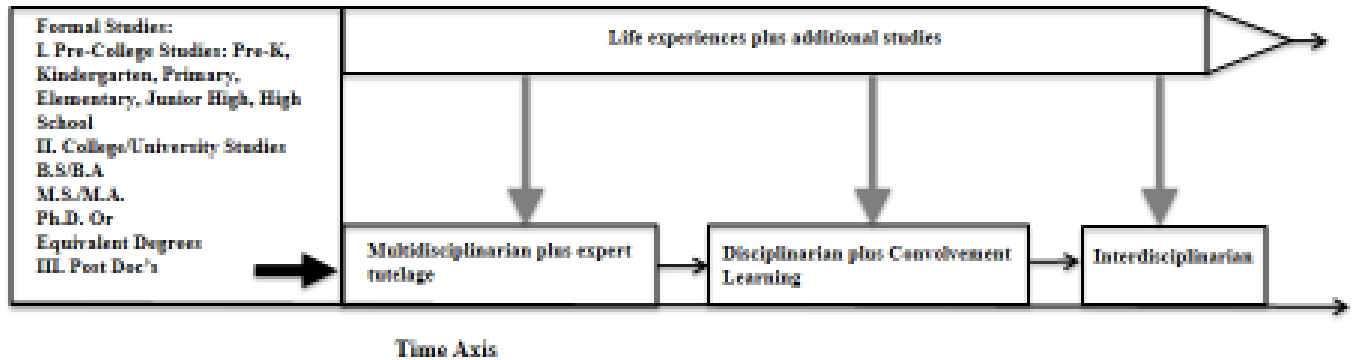


Figure (2g) Indirect Transition to Interdisciplinary Through Disciplinarian States

3. DISCUSSIONS AND CONCLUSION

Often individuals having strong parenting and socio-economic advantages can ideally emerge through the direct Career-path alliances as a disciplinarian or interdisciplinary; however, lifetime experiences show that often other individuals with less strong parenting support and socio-economic disadvantages can achieve the same outcomes, either disciplinary or interdisciplinary, from first quiescing temporarily in some cases or from persisting sometimes longer as a multi-disciplinary. Then after sometime, the individual accrues the expert tutelage for being a disciplinarian, and becomes such, having now what might be called a controlled straight line trajectory state of being, having deconvolved and slough off useless activities or on the other hand acquires the additional, prerequisite convolvement learning resulting in the transition to an interdisciplinary, with now a “controlled spiraling circulatory” state of being instead of being uncontrolled. For such an individual, with less than ideal parenting and socioeconomic disadvantages “the village” or effective, global communal support [21-22] is often what is needed to fill critical voids.

Since the multidisciplinary Career-path alliance is the state of being of an underdeveloped, non-focused individual, one should persist, as such, in this state of being just long enough to transition to either the disciplinarian or the interdisciplinary state. Otherwise, the individual remains trapped in less than

a viable or productive state of being, often with an incoherent, uncontrolled spiraling state of being.

While being a disciplinarian is still the ideal alliance, particularly pertaining to achieving tenure and other job security, at the modern workplace, the interdisciplinary has gained in credibility to the extent of being viable and competitive to the disciplinarian alliance, thus offering an interesting alternative.

Finally, our research when depicted in Figures (2a) - (2g), the outcome show that states of being (Career-path alliances) structures can be generated, depicting direct occurrences in three cases and transitional state of being in four others, and the achievement of each Career-path alliance rests on the motivation, the internal drive, and the aspirations of the pursuer.

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5. REFERENCES

- [1] Augsborg, Tanya, (2006). "Becoming Interdisciplinary: An Introduction To Interdisciplinary Studies," 2nd, edition, Kendall/Hunt Publishing Co.
- [2] Lindholm-Romantschuk, Y. (1998). Scholarly book reviewing in the social sciences and humanities. The flow of ideas within and among disciplines. Westport, Connecticut: Greenwood Press.
- [3] Gibbons, Michael; Camille Limoges, Helga Nowotny, Simon Schwartzman, Peter Scott, & Martin Trow (1994). *The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies*. London: Sage.
- [4] Dogan, Mattei & Pahre, R. (1990). "The fate of formal disciplines: from coherence to dispersion." In *Creative Marginality: Innovation at the Intersections of Social Sciences*. Boulder, CO: Westview. pp. 85–113.
- [5] Baldick, C. (1990). The concise Oxford dictionary of literary terms, Oxford and N.Y., Oxford University Press.
- [6] Newell, W. H. (2001) "A theory of interdisciplinary studies", *Issues In Integrative Studies*, 19, 1-25.
- [7] Frank, R. (1988). "Interdisciplinary": The first half-century. *Issues in Integrative Studies*, 6, 139-151.
- [8] Klein, J. T. (1996). *Crossing Boundaries: Knowledge, disciplinarity, and interdisciplinarity*. Charlottesville and London: University of Virginia Press.
- [9] Menard, L. (2001). Undisciplined. *The Wilson Quarterly*, 25(4), 51-60.
- [10] Newell, W.H., Hall, J., Hutkins, S., Larner, D., McGuckin, E., & Oates, K. (2003). Apollo meets Dionysius: Interdisciplinarity in long-standing interdisciplinary programs. *Issues in Integrative Studies*, 21, 9-41.
- [11] Jacobs HH, Borland JH. (1986). The Interdisciplinary Concept Model—Theory and Practice. *Gifted Child Quarterly*; 30(4):159–63.
- [12] Morillo F, Bordons M, Gomez I. (2003). Interdisciplinarity in Science: A Tentative Typology of Disciplines and Research Areas. *Journal of the American Society for Information Science and Technology*; 54:1237–49.
- [13] National Academy of Sciences (2005). *Facilitating Interdisciplinary Research*. Washington, DC: The National Academic Press.
- [14] Swoboda, W. W. (1979). Disciplines and Interdisciplinarity: A Historical Perspective. In Joseph. J. Kockelmans (Ed.), *Interdisciplinarity and Higher Education* (pp. 49-92). University Park: The Pennsylvania State University Press
- [15] Aram JD. (2004). Concepts of Interdisciplinarity: Configurations of Knowledge and Action. *Human Relations*.; 57(4):379–412.
- [16] Frost SH, Jean PM. (2003). Bridging the Disciplines—Interdisciplinary Discourse and Faculty Scholarship. *Journal of Higher Education*.; 74(2):119–49.
- [17] Matthew E. Edwards, (2014). *Journal of Systemics, Cybernetics and Informatics*, "Recognizing the Need for Rich Contextualization in the Classroom and Applying It With Modified Bloom's Cognitive Domain Taxonomy For Successful Teaching of Physics 106 (Physics II – electricity, magnetism, and Light), Vol. 12, No. 3.
- [18] Siemann, U. (2005). "Solvent Cast Technology – A Versatile Tool for Thin Film Production," *Progress Colloid Polymer Sci.*, 130, 1-14.
- [19] Matthew Edwards, Stephen Egarievwe, Afef Janen, Tatiana Kukharev, Jemilia Polius, John Corda, (2014). "Temperature Dependent Surface Resistivity Measures Of Commercial, Multiwall Carbon Nanotubes (MWCNT), and Silver Nano-Particle Doped Polyvinyl Alcohol (PVA) Films", *Materials Sciences and Applications*, 5, No. 13, 915-922.

[20] Quianna S. Johnson, Matthew Edwards, Michael Curley, (2013). "Analysis of the refractive index and film thickness of Eu doped gadolinium oxide (Gd_2O_3) planar waveguides fabricated by the sol-gel and dip coating methods", SPIE Vol. 8847, no 5.

[21] Simmons, Russell and Chris Morrow, (2014). "Success Through Stillness: Meditation Made Simple", Gotham Books, Penguin Group, New York.

[22] Clinton, Hillary Rodham, (2006). "It Takes A village" 10th anniversary edition, Simon and Schuster, New York.