Developing research cultures in teacher education institutions:
the gestation-expansion-maturation theory [version 1; peer review: awaiting peer review]

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Abstract
An understanding of the development of research culture in universities is vital in the fulfillment of their mandate for knowledge generation. This study aims to develop a framework that would describe the journey of research culture development in teacher education institutions. A deductive approach to theory development where scholarly literature serves as the foundational bases to generate a theory was utilized. Secondary analysis was used to analyze the data collected from available research studies and literature. The generation of the theory was built on the readings and discussion about the process of building a research culture in higher education. Axioms were generated to be able to come up with propositions. The following propositions are posed: 1) Research culture is contextually defined; 2) The development of research culture undergoes phases of development from initiation to maturation. 3.) The levels of research culture development can be attributed to quality human resources, the institutions’ material resources, and its research activities. From the propositions, it was concluded that the development of a research culture undergoes the phases of gestation, expansion, and maturation which are achieved through the presence of people, resources, and research activities that appear or function differently at each stage.

Keywords
research culture, investment, phenomenon, norm, process
Introduction
Universities are defined as institutions of higher learning, which are primarily geared towards knowledge generation. Knowledge generation is an identifying characteristic of a university (Marchant, 2009). Assessing universities encompasses both academic and research evaluations (Boholano et al., 2014), which are many times reported in the form of university rankings. Samarasekera and Amrhein (2010) reported that the three major international rankings that receive widespread following are: (1) The Academic World Ranking of Universities, (2) the QS World University Rankings, and (3) the Times Higher Education Rankings. All of these standings put a premium on research productivity.

Among the many world rankings of universities, the Times Higher Education World University Rankings is the only one that evaluates research-led universities in terms of core functions --- teaching, research, knowledge transfer, and international outlook (Times Higher Education, 2015). The criteria reveal that in looking into excellent higher education, instruction is still present, but more indicators are research-related. For the academic year 2014-2015, the results of their ranking reveal that the top ten universities of the world are not teaching institutions but research-driven institutions with related academic functions influenced by knowledge generation (citations) and innovations (industry income). This criterion does not focus on quantity but puts a premium on the value and quality of research productivity associated with quality university education.

In the Philippine setting, the University of the Philippines (UP) is leading in terms of research (Valencia, 2004). However, it did not reach the Top 400 per Times Higher Education World Rankings. In a separate but equally reputable ranking of universities of the world, only four Philippine universities, out of a total of 2,299 higher education institutions in the country, were included in the top 800 led by the University of the Philippines (Rank 367). It can be said then that a leading university in the world and the country has invested in the development of its research culture.

There are as many definitions of research as there are people who define it. Mertens (2010) defines research as activities relating to an inquiry, which is systematic, and designed to gather, investigate, interpret, and use data. Similarly, Kerlinger (1970) views research as a critical investigation done scientifically to test hypothetical propositions. For this study looking into how a research culture develops in teacher education institutions, research is defined as a systematic process of investigating a phenomenon to contribute to the growth of the existing body of knowledge. While the “research culture” of higher education institutions refers to how people perceive research and its relevance gleaned from the programs and policies they put into place in the conduct of such function.

Salazar-Clemeña and Almonte-Acosta (2007) recommended that it is useful to investigate whether or not all higher education institutions in the country should become research-intensive colleges and universities. This concern may be caused by the historical traditions of Higher Education Institutions (HEIs) in the country, which most have been established to focus on teaching, and the tremendous resources it would demand to build a research culture in them. On top of this, there is a notion that research is an additional task and burden rather than an embedded activity in the academy.

In partnership with Thomson Reuters, which holds the reputation of being the world’s leading source of intelligent information, Times Higher Education releases annual rankings of universities in the world. Assessment of these universities was based on their performance in the following areas: Teaching, Research, Citations, Industry Income, and International Outlook. The criteria of Teaching, Research, and Citations are given an equivalent of 30% in the overall ranking score, while Industry Income and International Outlook are given 2.5% and 7.5%, respectively. The criterion for Teaching cover the learning environment while the criterion of Research includes volume, income, and reputation. The criterion of Citations refers to research influence (Times Higher Education, 2015). The criteria reveal how research is emphasized in the world rankings of universities.

These universities, at a closer look, reveal that they are of varying degrees in terms of the set criteria. The top ten universities of the world are as follows: 1) California Institute of Technology, 2) Harvard University, 3) University of Oxford, 4) Stanford University, 5) University of Cambridge, 6) Massachusetts Institute of Technology, 7) Princeton University, 8) University of California, 9) Berkeley and 10) Yale University (Times Higher Education, 2015). In terms of Teaching, Harvard University has the highest score of 92.9%. The same university has the highest score for Research at 98.6%, while the Massachusetts Institute of Technology (MIT) has the highest score at 100% in terms of citations. It is noted that MIT has the lowest score for Research in the top ten at 88.2% but the highest in Industry Income at 95.7%. The top university in Asia in the Times Higher Education World Rankings is the University of Tokyo with a score in Research of 88% while Teaching is 84.7%. Citations of the said university fall at 69.8% while industry income is at 56.7%. Dominantly, this university is also a research university. Further analysis of the World Rankings revealed that the list is still dominated by universities from the United States and the United Kingdom through there is an observed decline in the rankings of US educational institutions and a rise in Asian universities (Times Higher Education).

Since no Philippine university made it to the Times Higher Education World University Rankings, one needs to use another credible source of rankings, which is the Quacquarelli Symonds (QS) World University Ranking. The ranking is based on the following criteria: a) Academic Reputation-40%, b) Employer Reputation-10%, c) Faculty/Student Ratio-20%, d) Citations per Faculty-20%, e) International Student Ratio – 5% and f) International Staff Ratio – 5% (Quacquarelli Symonds, 2015). The University of the Philippines (Rank 367) leads the group followed by Ateneo De Manila University (Category 461-470), De La Salle University (Category 651-700), and the
University of Santo Tomas (Category 701+). The results for both international and national rankings also revealed that each of these mentioned higher education institutions is at a certain level, in the process of developing its research culture.

The existing studies on the research culture of educational institutions reveal that there are vital factors that are to be integrated into the system to nurture the research culture in these colleges and universities. The researcher has observed that these factors do not come all at once in the journey of the university suggesting that its growth and development occur in certain phases. The existing literature on research culture does not discuss how it develops in teacher education institutions, and this paper seeks to address this gap by proposing a theory on the development of research culture in higher education institutions. This study utilized the deductive approach in theory development (Garcia, 2020; Padua et al., 2010; Vasquez, 2014) to propose a framework that serves as a guide for universities to build a research culture. Understanding how a research culture develops through the years can serve as a guide for higher education institutions that seek to strengthen their research function and become reputable in the field of knowledge generation.

Methods

This study utilized the deductive approach in theory development where the scholarly literatures serve as the foundational bases to generate a theory (Garcia et al., 2015; Padua et al., 2010; Vasquez, 2014). This study utilized theory-building research, specifically the theory-then-research strategy to create a theory that would explain the occurrence of the phenomenon (Garcia, 2020) of building a research culture. This strategy is informed by corresponding assumptions about the nature of scientific knowledge, “that science is a process of inventing descriptions of phenomena” that there are multiple and divergent realities and therefore “truths,” and that the purpose of science is one of interpretive discovery and explanation of the nature and meaning of phenomena in the world in which we live and experience life. This method was used in recognition of existing studies identifying factors and elements that go into building a research culture, but these are not analyzed to propose the stages by which they fall under leading its development.

Data were collected from literature and studies about the development of research culture from its early stages and when it is considered to have reached maturity in a university. The search was done through Google Scholar using the keywords research culture, higher education, teacher education institution, and development of culture. Only the literature that discusses research culture in the context of higher education and teacher education institutions when applicable was included in the analysis. Existing policies and programs of relevant agencies and the teacher education institutions themselves were also looked into. After gathering all the relevant studies and literature, a secondary analysis was done to generate a theory on the process of building a research culture. It allowed the researcher to explore certain areas about the building a research culture in an educational institution without going through the collection of data in the field (Babbie, 2020).

The different readings are cited in the discussions below to identify consistent variables, processes, and patterns in the development of the research culture, which was crafted to become axioms. Concepts that pertain to the building of research culture in the institution were identified to create propositional structures that could explain the topic under study. These were inferences derived from the axiomatic discussion. Ideas relating to the research process itself or the researcher’s personal journey were not considered in the building of the theory. Since data was gathered from existing literature, there are no participants involved in the study. The output was reviewed by five experts on research culture and teacher education.

Results and discussion

The readings and discussions about the development of research culture were used to build the theory as what is being presented in Table 1. Existing literature reveals that research is defined in a variety of ways. One way of looking at it is as a process of knowledge generation as teaching is seen as knowledge dissemination (Valencia, 2004) and so being a researcher means that you are a partner in the creation of new knowledge (Shamai & Klir, 2002 as cited in Tan, 2007). Cohen et al. (2007) see research as one of the many ways man seeks the truth. In all the various definitions, it is viewed as an act of investigating a phenomenon systematically to contribute to the existing body of knowledge.

Literature defines culture as a “peculiar way of life” of the academic community, a paradigm or mindset, a way of thinking, behaving, or working in a place or organization (Hofstede, 1997). Evans (2012) defines research culture as communal values, assumptions, beliefs, rituals, and other forms of behavior to have research practices accepted and recognized and produce research outputs as a significant, worthwhile, and pre-eminent activity. In this investigation, “research culture” is defined as the set of shared goals, resources, and activities in a teacher education institution that leads to prolific knowledge generation. Analyzing an institution’s research culture will reveal the mindset and outlook of the members of the said institution, and how they think, act, and value the research process.

The multi-dimensions of research activity and productivity in an institution show that its research culture has a beginning that has not happened by chance but was deliberately put into place. Research culture is born when necessary, structures supportive of its growth are initiated. It is important to note, however, that to grow, it needs more than structure and systems in place. In the global arena, it is a challenge for Philippine universities to level up their research productivity and improve their research culture. It is no surprise that the Commission on Higher Education (CHED) issued Memo 46, s. 2012 calling for the typology of higher education institutions. This memo states that the “quality assurance system puts into place horizontal typology wherein
a higher education institution can be classified as a (a) professional institution, (b) college or (c) university, underscoring those particular types of HEIs will respond fittingly to particular global and national challenges. Although the mandates of the types are not mutually exclusive, they provide a focus for the HEI, especially in the use of resources. They are differentiated through features in their desired competency of graduates, kinds of academic and co-curricular programs, qualification of faculty, learning resources and support structures, and the nature of their linkages and outreach activities (Commission on Higher Education, 2012).

The Commission on Higher Education (2012) defined an institution of higher learning to be categorized as a university when it has a focus on “providing highly specialized educational experiences to train experts in various technical and disciplinal areas and emphasizing the development of new knowledge and skills through research and development...thus a research orientation is emphasized in the Bachelor, Master’s and Doctoral degree programs.” This reveals that in a university, the robust culture of research is evident and that it cascades not only to the level of the faculty members but also to the level of the students.

In the study of Houlihan (2007), an Australian on-site program director stated, “there are relatively few students who are adequately skilled in these (field research) areas when they come to our program. Most of them need a lot of instruction and assistance to complete their research projects, but that is part of what we’re all about — helping students acquire or improve these critical skills”. This supports the contention that a research culture is not just established but has to be nurtured.

This paper operates on the assumption that the ‘ideal’ structure and culture for research is one wherein it is seamlessly integrated with academic work (Marchant, 2009). The development of the research culture is of great importance for higher education institutions with consideration of their typology. Moreover, this is now a growing concern for basic education as well because action research is now encouraged for accreditation and faculty promotion. In the Department of Education’s Results-Based Performance Management System per DepEd Memo No. 2, S. 2015, teachers are also rated for innovation and thus paving the way for embedding the research function in the life of every academic, starting at the basic education level.

Valencia (2004) looked into the productivity of 465 researchers with a Ph.D. in terms of international scientific publications. This survey was done in the science and engineering colleges of selected research universities in the Philippines from 1998 to 2002. The researcher counted the research articles listed in the Science Citation Index of the Institute for Scientific Information (ISI) and used this data as a basis for publication counts. Results revealed that despite having the most publications, the University of the Philippines has a mean productivity of less than one (1) international publication per year is met by only one of the academic units included in the study.

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<th>Axioms</th>
<th>Propositions</th>
<th>Theory</th>
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<td><strong>Axiom 1.</strong> A research culture in higher education institutions is initiated, nurtured, and established in various phases.</td>
<td><strong>Proposition 1.</strong> Research culture in teacher education institutions is contextually defined.</td>
<td>The development of a research culture in teacher education institutions admits to different stages of development: 1) Gestation (initiating stage), 2) Expansion (developing stage), and 3) Maturation (flourishing stage) through the presence of people, resources, and research activities that appear or function differently at each stage. (Gestation-Expansion-Maturation Theory)</td>
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<td><strong>Axiom 2.</strong> There are essential factors in the development of the research culture in a teacher education institution.</td>
<td><strong>Proposition 2.</strong> Research culture in teacher education institutions undergoes phases of development from initiation to maturation.</td>
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<td><strong>Proposition 3.</strong> The development of research culture can be attributed to quality human resources.</td>
<td><strong>Proposition 4.</strong> The institution’s material resources contribute to the development of its research culture.</td>
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<td><strong>Proposition 5.</strong> The institution’s research activities contribute to the development of its research culture.</td>
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In international and national evaluations, research institutions are evaluated through their outputs and thus highlighting that a research culture is established when research results are disseminated and utilized to contribute to the growing body of knowledge, development, and innovation. The above studies support that a research culture in higher education institutions is initiated, nurtured, and established in various phases (Axiom 1). This then suggests that teacher education institutions may vary in their view of what research culture is and may not be of the same level of development. Some may still be in the initial stage, and others are more nurtured, while a few may have already reached the level of being well established.

From Axiom 1, the researcher proposes that research culture in teacher education institutions is contextually defined (Proposition 1) and undergoes phases of development from initiation to maturation (Proposition 2). The concept of development suggests that it undergoes a process that begins with the setting up of the requisites necessary for its growth. Teacher Education Institutions (TEIs) do not acquire a robust research culture all of a sudden and thus supporting the idea that it has a beginning. To continue to be relevant in the ever-changing landscape of education, the research culture should not stagnate and remain as it is when it began. The growth and development of an institution’s research culture are facilitated by deliberate efforts to reach a level of significance in the academic community.

Existing literature on the development of the research culture reveals that it necessitates certain attributes. Marchant (2009) cited the elements that are needed in the development of research and research culture, which are as follows: high-level focus, specialized research leadership and administration unit, local or sub-unit factors, and human resource management policy, procedure, and processes. Culture, in the view of this paper, reflects the personality of each university and distinguishes one from another. The researcher also observed that for a university, faculty, or school to claim to have a strong research culture, research must be valued by a majority of its members.

In the paper of Salazar-Clemeña & Almonte-Acosta (2007), attitudes and values concerning research within institutional and organizational levels are considered potent factors of research productivity. Three domains of focus were identified upon the investigation of related studies that looked into the kind of environment that leads to research productivity among faculty members. The domains include the faculty’s trifocal task of Teaching, Research, and Community Service or Extension (Domain 1); the Individual Attributes and Output that focus on the researcher’s characteristics relative to his conduct of research (Domain 2); and the Institutional Attributes and Policies, which refer research policies of the higher education institution (Domain 3). The results of their study led them to recommend that research culture is built with consideration to the a) dynamics of the interaction of the trifocal function of HEIs, b) the researcher’s mind, and c) the body of the institutional policy.

Very few studies have looked into the research culture at the level of the students in the context of teacher education institutions. Most of them are only case studies. Garde-Hansen & Calvert (2007) conducted a case study on the development of research culture in the undergraduate media communications degree. Their research revealed that there are various ways to build a research culture. They included the following: (a) recognition of course and faculty dissertation; (b) congratulatory letters from tutors and external examiners for exceptional research performance; (c) online display of good undergraduate research projects; (d) extra credits in a course for extra research undertaken; (e) maximizing internet and information and technology resources to create a productive virtual research environment; (f) peer mentoring through a variety of strategies; (g) involving students in the institution’s research projects; (h) working with the community in a variety of research initiatives; (i) group dissertation tutorials online or face-to-face; and (j) establishing research ‘blogs or personal digital research archives.

These studies reveal that there are essential factors in the development of the research culture in a teacher education institution (Axiom 2). For quality outputs to be possible, institutions must consider quality inputs. Over some time in various phases, as stated by Axiom 1, certain elements must be looked into to foster the growth of the research culture.

Pratt et al. (1999), as cited by Marchant (2009), shared that those educators who undertake relevant research in their field can improve instruction in the process. Graduate teaching programs have become a driving force for the development of the departments, and the graduate students themselves help in developing new knowledge and exploring the frontiers of the discipline alongside their supervisors. Graduate students, a thriving research program, and publications in the recognized academic and professional journals and conferences are hallmarks of successful university faculties. This highlights the contributions of researching professionals in their field of discipline.

In a paper on the elements that contribute to the development of a research culture, Bland & Ruffin (1992), as cited in Jung (2012), identified the following 12 factors present in high-performing research environments. These are: a) clear goals for coordination, b) research emphasis, c) distinctive culture, d) positive group climate, e) decentralized organization, f) participative governance, g) frequent communication, h) resources (particularly, human resources), i) group age, j) size and diversity, k) appropriate rewards, l) recruitment emphasis, and m) leadership with both research skill and management practice. A close look at these variables reveals the necessary contribution of the human resources of an educational institution for the development of its research culture. Human resources
in this paper cover the members of the administration or management, the faculty, and the students.

In building a culture of research, there are related studies that reveal recommended practices. Hanover Research (2014) presents the need for the following: (a) clear research direction and effective communication of such; (b) allocation of significant resources for faculty capacity building and support; (c) open and collaborative personal relationships among faculty members; (d) personalized support mechanisms (e.g. level of motivation, level of ability); (e) sustainability of research culture; and (f) consideration of student involvement.

Research practices indicate that both human and non-human resources should be present for an institution to move from mere establishment to nourishment and ultimately to its complete enhancement. Since most studies focus on the research productivity of the faculty, it is called upon that the research culture at the student level be looked into as well. Healey and Jenkins (2009) opine that student engagement in research pursuits can be investigated through four perspectives:

a) research-led: studying research that is relevant to the field of discipline; b) research-oriented: learning research technicalities; c) research-based: involving themselves in research and inquiry; and d) research-tutored: participating in research dialogues.

This model, amended from the one in Healey (2005), has two axes, (1) the manner of student engagement, from being part of the audience or participants of research undertakings, and (2) the classification of the approach used, from emphasizing research content or research processes and problems. These classifications aid academic institutions in making decisions on which perspective to use in introducing research to their students and which pedagogies to use to achieve this aim. No perspective is above the other, as all are valid and significant. A school curriculum should consider all four.

The Commission on Higher Education (CHED) has released directives geared toward improving research productivity to alleviate the scarcity of research in the colleges and universities in the Philippines (Salazar-Clemeña & Almonte-Acosta, 2007). Various higher education institutions in the country have taken steps to strengthen their research orientation. Despite CHED’s initiatives, there is still a need to improve the research undertakings in the country in terms of quantity, quality, thrusts, and contribution to national development (Salazar-Clemeña in Salazar-Clemeña & Almonte-Acosta, 2007).

Putting all of these studies together with Axiom 2, this paper further proposes that the development of research culture can be attributed to quality human resources (Proposition 3). At the core of research culture development, is the people involved in the conduct of such functions. This paper focuses on three categories of the human resources of a teacher education institution, namely: the administration, faculty, and students. It is important to note that Axiom 2 mentions factors, and while literature just cited goes beyond the administration, faculty, and students. This paper also suggests that the institution’s material resources (Proposition 4) and its research activities (Proposition 5) contribute to the development of its research culture. Material resources pertain to the materials and equipment that help facilitate the conduct of research while research activities cover activities ranging from capacity building to dissemination of outputs.

The axioms and propositions lead to the generation of the Gestation-Expansion-Maturation Theory, which holds that the development of a research culture in teacher education institutions undergoes phases from initiation to maturation. The research culture admits to different stages of development: 1) Gestation (initiating stage), 2) Expansion (developing stage), and 3) Maturation (flourishing stage).

Gestation is the period of setting up what would serve as the foundation of the teacher education institution’s research culture. In this phase, the institution asks: What does a Teacher Education Institution need to have a good foundation for a strong research culture? Gestation is the stage where the teacher education institution goes into capability building in terms of enabling the faculty and allocating budget and production as manifested by conducting research and writing manuscripts. The achievement of these is facilitated by the acknowledgment of their research function through establishing systems at the level of the institution and the fulfilling of duty by the faculty and their benchmarking activities which sought to identify standards and meet fundamentals. At the gestation stage, the institution is laying the foundation of its research culture.

When an institution reaches a certain level of stability and a steady increase in quality research activity and output, it has reached Expansion. The question that is posed here is: What does a Teacher Education Institution need to build on the good foundation set for a strong research culture? This is the period wherein existing policies and programs are nurtured, and other elements are added to continually expand. Research culture is then said to expand when there are collaborations as manifested by building teams and attaining grants, which happen side by side with paper presentation and article publication, which are dissemination efforts. Slowly, research permeates functions in the institution, which can be due to the shifting paradigm of all its stakeholders. Because of collaboration, dissemination, and emphasis, the institution begins to determine its niche in the academic community and is then in the position of being able to foster affiliations.

Maturation of the research culture is reached when the TEI consistently takes on research activities and produces quality outputs and it reaches a period of the establishment of its
standing in the academic community. It is at this juncture that
the question takes on the form of: What does a TEI need to build
credibility in the academic community as a reputable endur-
ing research institution? Maturation is achieved when the insti-
tution spearheads projects and generates resources and thus
manifesting how institutionalized research is in the institution.
Research outputs in this stage are used to influence policies
and introduce technology. This is made possible because of
the prioritization done by the institution in its efforts to accli-
matize the environment and internalize the role of being a
researcher. Ultimately, the institution in this stage exhib-
ts leadership in its ability to demonstrate expertise and
pioneer development.

To reiterate, the real measure of maturity in research culture,
however, is when the teacher education institution makes the
research a norm in the institution. At every stage, it seeks to
build its impact and its identity both illustrating a develop-
ment mindset and a growth mindset. When this is achieved,
the presence of a research culture can then be said to be a phe-
nomenon in that it is an exceptional occurrence in a higher
education institution.

All of these levels of development are achieved through the
presence of various factors: people, resources, and research
activities. Figure 1 reveals the stages of the development of a
research culture wherein the specific attributes are present in
each stage, but they appear or function differently until matur-
ity is reached. In the development of research culture, retro-
gression is also possible if some of the aforementioned factors
are not nurtured or sustained.

**Conclusion**
The development of a research culture undergoes the phases
of gestation, expansion, and maturation which are achieved
through the presence of people, resources, and research activi-
ties that appear or function differently at each stage. Gestat-
ton is a period of laying down the foundations of a research
culture focused on capability-building with outcomes mani-
esting as research production. Expansion, on the other hand,
is the stage of development wherein collaborations inside
and outside the institution are fostered with a highlight on the
research dissemination activities. Lastly, maturation is described
as a stage of leadership that reveals itself through the institu-
tion’s ability to demonstrate expertise and pioneer develop-
ment. At every stage, the measure of development is how widely
research is accepted as a norm in the institution which makes
itself evident through the impact of its knowledge genera-
tion activities which add to the clarification of the institution’s
identity through its research niche. Retrogression in the

![Figure 1. The Gestation-Expansion-Maturation Theory on the Development of Research Culture.](image-url)
levels is possible if identified factors are not nurtured and sustained.

Data availability
All data underlying the results are available as part of the article and no additional source data are required.

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