COUNCIL OF GRADUATE SCHOOLS

THE UNIVERSITY OF MISSOURI KANSAS CITY CGS STRATEGIC CONSULTATION REPORT

Initial Report

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Review and Site Visit

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Executive Summary

The School of Graduate Studies (SGS) at the University of Missouri-Kansas City (UMKC) requested a Council of Graduate Schools (CGS) consultation to provide a review of their Interdisciplinary Doctor of Philosophy (IPhD) Program and offer recommendations of best practices. CGS invited three Graduate Deans to review the Consultation Assessment Profile and conduct an on-site visit. Three areas of emphasis were highlighted in the Assessment Profile. These included 1) assessment, research, and funding practices for the IPhD, 2) demand for the IPhD, career pathways, the student experience, and 3) recommendations for a redesign and/or restructure of the IPhD Program to align it with best practices for an interdisciplinary PhD program. During the site visit, meetings were scheduled with senior university leadership, School of Graduate Studies staff, faculty and administrators from participating units, students in the program, and other partners whose functions intersect with those of the School of Graduate Studies. The Executive Summary indicates the challenges and briefly introduces options for consideration.

Profile 1 Executive Summary

IPhD Assessment, Research, and Funding Practices to Inform Sustainability and Reinvestment.

The consultants found the IPhD to be rigorous and adequately assessed, commensurate with traditional norms of a doctoral degree. Although the interdisciplinarity of the degree is assessed in at least three points along the degree timeline, the consultants found that there is an overreliance on coursework for the interdisciplinarity. Therefore, options other than coursework in a co-discipline should be explored. For example, the program may elect use of a tool or technique from a discipline other than the primary discipline. This will enable the interdisciplinarity to align more naturally with the research problem. Because of UMKC's decentralized funding model, there is the potential for wide disparities in stipend levels across units. Although a minimum stipend has recently been implemented, stipends at UMKC are well below national averages. Sustained, strategic investment in areas of growth would be facilitated by centralizing funding for the IPhD in the School of Graduate Studies .

Profile 2 Executive Summary

IPhD Demand, Career Pathways, and the Student Experience.

The University of Missouri Kansas City has assessed four-year enrollment trends by discipline; net revenue, estimated costs, including salaries, supplies, unit overhead, unit reported evidence of current/future job demand, mission alignment and impact of other regional programs. These assessments should be complemented with a comparative analysis to determine which programs are meeting current forecasted labor demands, which programs should grow to meet forecasted increases in labor market demand, and which disciplines might be candidates for sunsetting due to insufficient labor market demand. An additional piece of that analysis would be to implement tracking of IPhD graduates for long term employment and career placement. Finally, the consultants also recommend that a periodic academic program review of discipline specific areas within the IPhD be implemented, to include both an internal and external assessment.

Profile 3 Executive Summary

Innovative Redesign and Restructure of IPhD Programs in Alignment with Practices of Exemplary Programs.

There are four major challenges to the UMKC IPhD program: 1) declining application numbers and low enrollments; 2) low degree award numbers; 3) programming that does not align with the UMKC Research Forward initiative; and 4) how interdisciplinarity is achieved. All four challenges indicate a need to examine the structure of the program. The options for this range from abandoning the IPhD altogether, which may not be feasible within the Missouri system, to a grouping of disciplines under umbrella interdisciplinary programs. Grouping of the disciplines within a unified interdisciplinary structure would preserve much of the character of the current program, but allow for an emphasis on the interdisciplinarity within those groupings and would also facilitate a student cohort experience, which is needed.

Introduction

The University of Missouri Kansas City

The University of Missouri-Kansas City currently holds a Carnegie Classification of Doctoral Universities: High Research Activity (R2). According to Carnegie, the institution enrolled a total of 16,372 students during the Fall of 2019. The UMKC School of Graduate Studies is led by Dr. Yusheng (Chris) Liu, Vice Chancellor for Research, Office of Research & Economic Development and Dean, School of Graduate Studies and Dr. Joe Parisi, Interdisciplinary PhD Program Director in the School of Graduate Studies.

Interdisciplinary Doctoral Study at the University of Missouri Kansas City

In 1990, UMKC launched its Interdisciplinary Doctor of Philosophy Program. Currently, the University hosts 20 active primary discipline IPhD programs and 2 co-disciplinary degrees. UMKC created the IPhD Program because the University of Missouri at Columbia (Mizzou), offers traditional single-discipline doctor of philosophy (PhD) programs. The IPhD Program at the University of Missouri-Kansas City serves two important goals. The IPhD Program advances research and study at the intersection of disciplines where innovation and competencies are emerging, and the degree programs create opportunities for faculty from smaller programs to partner with other disciplines and contribute to doctoral education.

The IPhD Initiative achieved many of the goals that were originally identified at the time of approval. The program attracts high-quality graduate candidates to the University who meet the demand for professionals with interdisciplinary expertise. Each interdisciplinary program requires that the candidate identify a primary discipline from among those participating in the IPhD Program and a co-discipline. In addition to a majority of hours of study in the primary discipline, candidates are required to complete from 9 to 15 semester hours of study in a co-discipline. A faculty member from the co-discipline also serves on the dissertation committee to guide the integration of research from the co-discipline into the proposed dissertation project.

In 2020, the University's Provost and Executive Vice Chancellor, in collaboration with the Chancellor and the faculty, launched a new initiative titled *UMKC Forward*. This strategic initiative is designed to advance the University during the next five years by investing resources in five keys areas that include student success, faculty excellence, research excellence, workforce preparation, and community engagement. The plan requires that every administrative unit examine

its current degree programs to objectively assess those that have the best potential to move the institution toward the goals established for *UMKC Forward*.

The UMKC leadership team observed that doctoral study has not benefitted from a review by experts external to the University. Therefore, a CGS Strategic Consultation was requested to evaluate the current status of interdisciplinary doctoral education in alignment with the goals of *UMKC Forward.*

Three consultants who hold leadership roles in graduate education participated in an on-site review on September 22 through 24, 2021. The consultants studied the University's current portfolio of IPhD disciplines focusing on three primary areas. The first included a review of assessment, research, and funding practices that inform program success and guide decisions and actions regarding program sustainability and reinvestment. The second area focused on the demand for graduates and career outcomes that further inform decisions and actions to strengthen the student experience and guide decisions about sustainability and reinvestment. The consultation concluded with identification of exemplary models and key metrics of IPhD programs that can be used as templates for innovatively redesigning and restructuring the University's current IPhD programs to achieve the strategic goals of doctoral graduate education. As there were three areas for consultation and three consultants, each consultant took primary responsibility for one section. Not surprisingly, when summaries of the sections were merged, there were similar findings within each of the three sections. To emphasize the importance of these findings, the consultants elected to retain these repeated areas in the report.

Assessment Profile 1
Assessment, Research, and Funding Practices of the IPhD

The sustainability of the IPhD Program at the UMKC is dependent upon recipients of the degree acquiring the competencies expected from a candidate holding the terminal degree in their field. Because the PhD is a research-based degree, the evidence of those competencies must come from products of original, substantive scholarship as shown by publications, presentations, and citations. Like any PhD program, the IPhD will only be sustainable if high quality students can be recruited to and retained in the program.

1.1 Review and Recommendations: Assessment and Research

As in many, though not all, single discipline PhD programs, students entering the IPhD at UMKC begin by taking advanced coursework. In the UMKC IPhD Program, coursework is required in two disciplines, not just one. Completing coursework in two disciplines seems to be one of the primary requirements of the "interdisciplinary" portion of the degree. It was apparent, however, that this requirement was highly dependent upon the individual members of the students' dissertation committee. Discussions with faculty and program directors indicated that, in some cases, the dissertation committee required more integration of the two disciplines in the thesis than in others. Discussions with program representatives also revealed that the interdisciplinary focus of the degree is valued highly by both students and faculty, but representatives also noted that there is not a concerted effort to establish or even discuss specifically what constitutes interdisciplinary research. This repeated observation should be considered if changes to the IPhD program are implemented. Even the National Science Foundation (NSF) has noted the debate surrounding whether research is interdisciplinary, multidisciplinary, or transdisciplinary. To guide review and discussion of the definition, the consultants urge those participating in the IPhD Program at UMKC to study the definition offered in the National Academies of Sciences, Engineering, and Medicine 2018 Report titled *Graduate STEM Education for the 21st Century* ([What Is Interdisciplinary Research?)](What Is Interdisciplinary Research?). One solution might be to introduce a set of courses common to the primary areas within the IPhD, one of which could be a course that specifically addresses the variations on disciplinarity listed above. See the References section of this report for a link to the full NASEM Report.

1.2 Review and Recommendations: Interdisciplinarity

As noted in the annual Assessment Report that was shared with the consultants, interdisciplinarity is assessed at least three times along a student's route through the IPhD program. The first assessment of interdisciplinary mastery is during the comprehensive exam. As with many traditional PhD programs, the IPhD requires degree candidates to pass a comprehensive exam. In the case of IPhD programs, this exam includes a component of the co-discipline. The 2020 Assessment Report indicated that students scored higher in

their primary discipline on the exam than in the co-discipline, which is to be expected. Note that here, the assessment is on knowledge and mastery in two disciplines, not on how those disciplines inform each other.

Interdisciplinarity is assessed again at the stage of the dissertation proposal. The 2020 Assessment Report indicates that "… mastery of interdisciplinary thought, writing, research methods…" was stable and acceptable. Finally, interdisciplinarity is assessed in the student's summative evaluation, the dissertation defense. The 2020 Assessment Report indicates that "…mastery of interdisciplinary thought …" was adequate. It should also be noted that the estimate of the dissertation defense as a whole was scored a 3.47 out of 5. Faculty in the IPhD program seem to be satisfied, overall, with the students they are advising, either as primary advisors or as committee members. The IPhD is being adequately assessed as a doctoral degree with due deference to disciplinary norms.

As noted previously, one of the primary ways that the interdisciplinary requirement in the IPhD is ensured is through completion of 9 to 15 hours of coursework in the co-discipline. A course of study in the co-discipline is defined early in the program before the main portion of a student's research project has commenced. In the best case, the co-disciplinary expertise informs the research direction. However, in other cases where a tool or a method from the co-discipline should inform the research, the role of the co-disciplinary portion remains tangential. As one of the students shared with the consultants, "Any research project becomes interdisciplinary if you get far enough into it."

Based on this review of current practices, the consultants believe that there is an over-reliance on completion of coursework for the interdisciplinary role within the IPhD, and on the assessment of the interdisciplinarity of the coursework. Based on this review, the consultants recommend that options other than coursework be implemented to satisfy the "interdisciplinary" portion of the degree. For example, interdisciplinarity mastery is better achieved through use of a tool or technique common in a discipline outside of the primary discipline. This practice would, by its nature, integrate two disciplines into the student's research project. It might be apparent, for example, at the stage of the dissertation proposal, that such a technique or tool is needed to adequately address the research question. Classes might be needed at that point, but they are specifically targeted to the research question at hand.

Consultant Cantrell shared an example representative of the recommended practice. As part of the research, a doctoral student who was working on holographic reconstructions for a cloud droplet probe, took classes in Fourier optics from Electrical and Computer Engineering (ECE). Several ECE faculty were included on the student's committee. The classes and committee appointment were in response to the research. These degree elements did not happen *a priori*.

Returning to issues concerning the structure of the IPhD program in more detail, the consultants heard some concerns that the co-disciplinary requirement in coursework can restrict the level at which graduate courses are taught or it restricts the range of co-disciplines available. For example, a graduate course in quantum mechanics will be taught at different levels if the instructor knows that the audience is composed of a mixture of physics and biology students, rather than just physics students. The result can end up serving neither the physics students nor the biology students well. The same result is true of graduate level courses in biology. Such issues can be ameliorated, and the consultants offer the following practice as an example.

Many of the representatives who participated in the discussions during the site visit valued the interdisciplinarity of the IPhD program at UMKC. However, the consultants found a frequent and common reply when asking the question, "If you could change anything about the IPhD, what would it be." The overwhelming reply was, "Get rid of the 'I'". To be clear, the representatives were not advocating elimination of the interdisciplinary nature of the degree. They were advocating, instead, for removal of the 'I' as a qualifier to their PhD program. Students are earning a PhD in this program, but the 'I' attached to the name of the degree is confusing and causing degree candidates to ask if the degree being earned is somehow less rigorous or valuable than a PhD.

The issue of using the IPhD label has been addressed primarily at the time of degree completion. Through the leadership of Dr. Joseph Parisi, the current Director of the IPhD Program, the diploma reflects the term Doctor of Philosophy, in contrast to IPhD. Printing the diploma using the standard Doctor of Philosophy or PhD has resolved some issues, but the 'I' as a qualifier within the programs of study still remains as a point of friction for many of the IPhD programs. This is relevant for assessment of the program in that that the essential structure, coursework, qualifying exams, dissertation defense, and final defense,

with research interspersed throughout, up to the defense, retains the standard structure for a traditional PhD. What the students earn **is** a PhD. The only difference is that the degree has a particular interdisciplinary focus. Advertising it as an IPhD should be revisited. This issue is also addressed in the review and discussion that follows in the next section.

1.3 Review and Recommendations: Recruitment and Retention

Enrollment in research-intensive PhD programs is driven by financial support in the form of assistantships that typically include a stipend, tuition support, and health insurance. Competitive offers of financial support are needed to sustain or improve enrolling the top applicants that the programs seek, typically referenced as "yield." Because UMKC's model for graduate support is decentralized, there is potential for wide disparities in the level and duration of compensation within the IPhD Program. Conversations with faculty, administrators and a limited number of students confirmed this practice. In areas with significant research funding, such as electrical engineering, there was general satisfaction with stipends and the duration of support. Satisfaction was related to the practice that the primary financial support was driven by external resources making the secondary or internal financial resources available for recruitment, for supporting the initial coursework phase, and for bridging to degree completion. In areas where external support is not as common, the consultants heard considerable frustration concerning availability of internal resources to fund the stipends that students receive and the duration for which they are funded. In fact, there seemed to be some confusion as to whether there was even a minimum stipend for PhD students at all.

Based on discussions that were held during the site visit, the consultants verified that there is a minimum stipend, recently implemented, of $12,500 per academic year (fall and spring semesters). While a guaranteed minimum stipend is a step in the right direction, $12,500 is significantly below the average stipends reported in the 2020-21 Graduate Assistant Stipend Survey by Oklahoma State University (OSU). See the References section of this report for a link to the survey.

Table 1 below provides a summary of the average stipends from the OSU Graduate Assistant Stipend Survey for teaching assistants from four disciplines. The stipends are for an academic year and do not include summer support. In addition, the stipends are not

adjusted for tuition waivers that may be included with the assistantship. It is important to note that UMKC participates in this survey and UMKC offers all of these disciplines in some form. All of the stipends in the survey are significantly above UMKC's minimum. While it is true that departments (disciplines) at the University may elect to pay their assistants at higher rates, the stated minimum in amount and duration is a powerful signal to potential students.

Table 1
Average Stipend from Four Disciplines
2020-21 Oklahoma State University Graduate Assistant Stipend Survey

Discipline	Average Stipend
Biology	$19,060
Computer Science	$19,202
English	$16,802
History	$16,364
Physics	$19,766

The consultants also learned during discussions with IPhD stakeholders that institutional support, or financial resources from university funds as opposed to external grants and contracts, seemed to be driven in large part by the needs for teaching undergraduate classes and labs. While time as a teaching assistant is a hallowed tradition in doctoral education, and does impart valuable skills and experiences, the consultants share that the PhD can no longer be viewed as an apprenticeship that prepares students for future careers in academia. Most of today's PhD recipients will not have jobs equivalent to those of their academic mentors and many doctoral candidates do not seek academic appointments.[1] A thriving, robust PhD program cannot be dependent upon the needs for undergraduate instruction. Investment in PhD programs that are in alignment with UMKC's desire for growth in strategic areas will require a commitment to support IPhD programs in those areas in a consistent, ongoing basis. One way to facilitate that commitment would be to centralize support for the IPhD program with the School of Graduate Studies.

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[1] See Leonard Cassuto's books, **The Graduate School Mess** and **The New PhD** for elaboration upon these points. Cassuto's perspective is from the Humanities, but many of the conclusions that he draws are directly applicable to STEM fields as well. See the References section of this report.

Assessment Profile 2
IPhD Demand, Career Pathways, and the Student Experience to
Inform Sustainability and Reinvestment

As noted previously in this report, data on demand for graduates of the IPhD program is necessary in order to guide institutional investment to meet demand. The consultants note that UMKC conducted a comprehensive review in academic year 2019-2020 of all its undergraduate and graduate programs. The review included detailed assessments of each discipline in the IPhD Program. The assessment focused on four-year enrollment trends by discipline including unit reported evidence of current and future job demand, alignment of the program with institutional missions, and impact of other regional programs. Program costs based on net revenue and estimated costs, including salaries, supplies, and unit overhead were also considered in the assessment review.

The School of Graduate Studies conducts an annual survey of graduate program directors to measure the outcomes of graduates of the IPhD Program by discipline or area. Summary statistics are reported annually, including the total number of graduates, percentage employed or continuing their education, and percentage of graduates with unknown outcomes. Responses are sometimes difficult to obtain, and the reliability of the data depends on the due diligence of the corresponding graduate program director. Most of the IPhD Programs have fewer than 5 graduates in each reporting period, thus statistics are suppressed to protect student confidentiality. The consulting team offers the following recommendations to address data collection and assessment more reliably and systematically in this critical area.

2.1 Review and Recommendations: IPhD Demand Data

A best practice for assessing demand is to create labor market portfolios for all of the active IPhD disciplines and conduct a comprehensive comparative analysis. The analysis will be used to determine which programs are meeting current labor market demands, which programs should grow to meet forecasted increases in labor market demand, and which disciplines might be candidates for sunsetting due to insufficient labor market demand. This data should inform the campus decisions to embrace one of the three organizational structures to be discussed in Area 3 of this report.

There are several higher education consulting firms and commercial data sources for determining demand for graduates of the IPhD Program and the various disciplines within these programs. Many universities invest in data available from Emsi Burning Glass Technologies (Emsi - Labor Market Analytics & Economic Data (economicmodeling. com). Emsi is a labor market analytics firm that specializes in analysis and reporting tools for colleges and universities. Emsi's labor market tool produces reports that combine Integrated Postsecondary Education Data System (IPEDS) degree completion data at institutions in the specified region of study with regional labor market data. The labor market data sources include traditional government sources such as the Bureau of Labor Statistics, US Census Bureau, and National Center for Employment Statistics. The sources also include regional job posting analytics collected from millions of job postings, government compensation data, and skills assessments gleaned from job postings and resumes.

The consultants offer this example of cost based on a current contract with Emsi and East Carolina University. As part of a system-level contract, one trained analyst in the Institutional Research (IR) Office is licensed to use Emsi tools at a cost of $4,500 per year for three years. This analyst produces reports for university faculty and administrative clients focusing on demand for their programs. The faculty and administrative clients provide Emsi with program definitions appropriate to assess program demand. These include the university code, Classification of Instructional Program (CIP) code, the educational level of interest (doctoral), the mode of delivery (in-person), student charges and the residency category. The University also includes the competitive comparison landscape (institution sectors) and the competitive region (for example UMKC would learn about competition in Missouri and its border states)

An Emsi report includes degree completion rates by institutions in the region of study, year-over-year growth rates, and institutional market shares. The report also includes the competitor's IPEDS tuition and fees, degree completion trend charts, labor market demand for target occupations (jobs, annual openings, median earnings) and five-year growth forecasts. A chart of regional and national 20-year trends with 10-year forecasts, occupation demographics, the number of matching unique job postings, five-year postings trend chart, and regional breakdown by states specified in the study are included. The report

provides top companies posting jobs, top cities posting opportunities, top posted occupations, top posted job titles, top talent providers (for example UMKC and competitor institutions) and UMKC's rank as a talent provider. The report offers top hard skills, top common skills, and top qualifications (based on frequency in job postings, frequency in workforce profiles). Appendix 1, attached to this consultation report, offers a sample report based on UMKC's Pharmaceutical Sciences Discipline (CIP code 51.2010, Pharmaceutical Sciences) in the IPhD program. (See Attachment 1 titled Appendix 1 Pharmaceutical Sciences Sample Emsi Report.) Contact information for East Carolina University's representative can be provided on request.

For UMKC's IPhD program, several strategies for selecting and combining appropriate CIP codes will be necessary. This can be accomplished by using CIP codes that align with the corresponding IPhD area or discipline in Emsi's web-based interface. It is important to note that the University of Missouri System inventory of academic programs (Inventory Link) has one listing for all of UMKC's IPhD disciplines: 30.0000 Multi-/Interdisciplinary Studies, General. Interestingly, the UMKC report, "Degree Completion Report by CIP Code" lists all degree completions under CIP Code "30.9999, Multi-/Interdisciplinary Studies, Other." When studying the demand data for UMKC's IPhD graduates, care will need to be taken to explore the CIP codes that align with its various IPhD disciplines. Noting that the UMKC's degree production data derived from IPEDS will likely appear under a 30.xxxx CIP code, it will be necessary to parse out UMKC's IPhD production into the appropriate Emsi degree production data by hand.

2.2 Review and Recommendations: Career Placement Data

As noted in Assessment Profile 2, data on career placements meeting demand for UMKC IPhD graduates is essential in order to evaluate the long-term success and optimal organizational structure of these degree programs. Based on the discussions held during the site visit, long-term employment and career placement data for IPhD students at UMKC is not being collected. Practices for collection of career placement data are labor intensive and typically require multiple alumni outreach programs that include exit surveys at the time of degree completion, alumni surveys, and continuous and systematic reviews of career networking sites such as LinkedIn to collect alumni profiles. Exit surveys typically

include annual surveys of alumni at five-year and ten-year intervals. Practices for collecting career placement and advancement data require an investment in staff who are assigned sufficient time to develop the surveys, to annually collect and analyze the data, and to develop strategies to address low response rates. As with practices for collecting labor market data, many universities invest in the services of commercial vendors for the collection of career placement data. Commercial vendors have developed comprehensive databases and have the capacity to match client's alumni data with the vendor's database to collect career placement data. Current costs for commercial data collection of alumni placements vary based on subscription levels and can often be purchased for approximately $5.00 per alumni. Emsi and Academic Analytics have software tools that provide this capability. For example, the Academic Analytics Alumni Suite is designed to find graduates and postdoctoral alumni employed inside and outside of academia.

The consultants note that the cost of purchasing these services may be significantly less than the investment in institutional labor required to produce data of a similar quality.

2.3 Review and Recommendations: Periodic Academic Program Review

Discussions with representatives during the site visit confirmed that UMKC has not conducted periodic <u>academic</u> reviews of the IPhD program and its disciplines. Based on this finding, the consultants recommend that UMKC institute a periodic academic review process for each major discipline at an interval of five, seven, or ten years. The review will include the following practices. 1) a faculty produced self-study, 2) an on-site visit by discipline specific faculty with a follow-up report, 3) a faculty response to the report and 4) action items to enhance the academic quality of the program.

The purpose of periodic reviews is to engage faculty in a reflective process of thoughtful study and evaluation of program quality and alignment to the institution's mission. Typically, a self-study is produced by the faculty in the program. The review serves multiple purposes. These include assessing the program's academic effectiveness, affirming the faculty's vision for the program, and reviewing actions for program improvement taken as a result of prior assessment activities. The review is also used to identify future programmatic improvements for the curriculum, pedagogy, and/or operational functions of the program. Inclusion of application, admission, enrollment,

degree completion, labor market, career outcomes and student satisfaction data in the program review process will be necessary to draw conclusions and formulate solutions for continuous programmatic improvement.

In traditional research-focused doctoral programs, it is especially important to compare the scholarly productivity of the faculty that support the IPhD disciplines with benchmarks of scholarly productivity from similar programs at peer institutions. There are academic consulting firms that can provide this kind of benchmarking data. One such firm, Academic Analytics, provides a benchmarking tool for assessing the scholarly productivity of doctoral programs compared to similar doctoral programs nationally. The tool provides the ability to filter the comparative group to peer institutions.

2.4 Review and Recommendations: Student Experience Data

Most institutions conduct exit surveys of their graduate students at the time of degree completion. However, the consultants recommend that UMKC consider conducting an "end-of-first-year" survey in addition to an exit survey. While surveying students who complete the program is important, it is equally important to collect both completion and attrition data so that information from students who do not complete the program can further inform program improvement practices. Surveying students at the end of their first year can give an institution the ability to gain valuable information from students who might not complete a graduate program. Sample first-year and exit surveys are provided in Appendices 2 and 3. (See Attachment 2 titled Appendix 2 Sample First Year Survey and Attachment 3 titled Appendix 3 Sample Exit Survey) .

In the data analysis phase of first-year and exit survey data, it is helpful to use grouping variables including enrollment status (part-time vs. full-time enrollment); delivery method (on-campus vs. distance education), undergraduate institution (comparing those matriculating from UMKC's undergraduate programs to those who matriculated from other undergraduate institutions), financial aid factors (amount of financial aid vs. none), employment status (employed vs. not employed), and program research requirements (required thesis vs. no required thesis).

Aggregate data can be shared with deans and graduate program directors; disaggregated data by college and program is shared at the college/program level for intra-

college comparisons. This survey data would be used in conjunction with other program data such as enrollment, degree completion, time to degree in program reviews and in the assistantship or fellowship allocation process.

Assessment Profile 3
Consultation on Innovative Redesign and Restructure of IPhD Programs in Alignment with Practices of Exemplary Programs

3.1 Review and Recommendations: Current IPhD Structure

The creation of the IPhD program was a response to a University of Missouri System requirement that the PhD programs not be duplicative of those at the flagship institution. The IPhD is marketed to applicants as interdisciplinary, and much work has been done to highlight the advantages of the educational approach as well as assure prospective students that the actual degree is a PhD and not an IPhD.

The interdisciplinary PhD (IPhD) program is housed centrally in the UMKC School of Graduate Studies and functions as an umbrella admission structure and enrolls graduate students in 24 distinct educational disciplines that may or may not have individualized core curriculum requirements. The interdisciplinarity among the disciplines is achieved using two strategies. The first is to meet foundational course-based requirements in each discipline. The second is to select a secondary mentor in a different discipline.

The UMKC leadership team sought consultants who could provide examples of IPhD programs that serve as exemplary models of excellence. These examples of exemplary models could guide the School of Graduate Studies strategic planning to systematically strengthen its current portfolio of degrees and advance its graduate program mission. One of the objectives of the consultation was to yield recommendations to systematically redesign and restructure current IPhD programs to achieve the strategic goals of graduate education in alignment with the research investment plan titled *UMKC Forward*.

The consultants include examples of successful IPhD programs and practices from institutions that have achieved a Carnegie Classification of Research Universities Higher Research Activity (R2) and Research Universities Highest Research Activity (R1) so that

the UMKC may consider its aspirational goals for advancing graduate study. Furthermore, the recommendations offer a framework and pathways for engaging in dynamic practices that promote the strengths, distinctiveness, and value of IPhD programs specific to the UMKC. The desired outcome is to prioritize responsibilities and strategically position the current leadership to achieve the defined goals of graduate education in the context of an expanding research agenda.

3.2 Review and Recommendations: Exemplary Programs and the National Landscape

It is clear that in order to solve the complex problems of society today, an interdisciplinary research approach is necessary. This thinking has been guiding the framing of both new knowledge generation and translational application of that emerging information to real world solutions for at least twenty years. Following from that, higher educational advanced degrees, including the PhD, have become increasingly interdisciplinary in order to train and educate future generations of thought leaders in the wide breadth of disciplines. Institutions have approached interdisciplinary PhD programmatic structure in a number of ways. Nevertheless, two major organizational themes have emerged. The first is to identify the research problem and then bring to bear an interdisciplinary approach to generate new knowledge in an effort to advance the field. This approach has taken the form of creating PhD programs where there is no prescribed curriculum or research boundaries and both the student, and the faculty mentors craft an educational and research plan specific to the problem being investigated. The second approach is to create a PhD program and inject elements of interdisciplinarity regardless of the research question. The latter has been the UMKC approach.

There are excellent examples of interdisciplinary programs across the country where students can create custom educational and research experiences that lead to the PhD. For example, at the University of Louisville ([Interdisciplinary Studies (PhD) < University of Louisville](#)) the interdisciplinary PhD program provides a mechanism for accommodating the interests of students and faculty in areas in which the faculty expertise is not confined to a department or individual academic unit. This practice permits students to establish individualized programs and groups of faculty members to establish interdisciplinary specializations.

The University of Washington ([Interdisciplinary Individual PhD (uw.edu)](uw.edu)) offers the interdisciplinary Individual PhD (IPhD) Program for exceptionally able students whose objectives for study are interdisciplinary and require supervision from faculty in two or more programs at the university that offer PhD degrees. Students design an individual course of study with guidance from their interdisciplinary supervisory committee. This program is managed by the IPhD Program Coordinator and headed by the Dean of the Graduate School.

At the University of Maine ([Interdisciplinary Doctoral Study - Graduate School (umaine.edu)](umaine.edu)) the Interdisciplinary PhD program allows qualified individuals to pursue doctoral study in areas where the university offers no formal degree program but has significant resources and expertise. The student may designate a particular field as the major field of study. In pursuing the degree, students follow a program of study approved by the academic advisory committee. The program includes coursework, applicable language and/or methodological requirements as determined by the committee, a comprehensive examination, a dissertation, and a final oral examination. Prior to submitting an application for the Interdisciplinary PhD program, each prospective candidate must meet with a representative of the Graduate School to discuss his/her educational goals. In order to be considered for admission to the program, applicants will normally hold a master's degree in a relevant discipline from an accredited institution of higher learning.

The University of California-Berkeley ([Interdisciplinary Doctoral Programs - Berkeley Graduate Division](https://grad.berkeley.edu)) allows doctoral students the opportunity to create an interdisciplinary major of their own design. Students must have successfully completed at least two semesters of graduate study in a doctoral program at Berkeley and need five faculty from multiple departments to support the proposal. Additionally, students have to demonstrate the project cannot be completed in any existing doctoral program. At these example institutions, applicants are admitted into existing departments/programs as PhD students and make application to create an interdisciplinary PhD program by proposing individualized curricula and research plans.

In contrast, Marquette University ([Interdisciplinary PhD // Graduate School // Marquette University](#)) admits applicants who already have a master's degree directly into the interdisciplinary PhD program providing students and faculty with opportunities for creative customized academic programming and research that crosses the boundaries of traditional disciplines. Any interdisciplinary PhD program must combine course work and expertise from two or more academic departments at Marquette.

A more common approach to interdisciplinary PhD programs nationally is to limit the interdisciplinarity to broad subject areas. For example, at the University of Texas-El Paso there is an Interdisciplinary Health Sciences PhD program ([PhD in Interdisciplinary Health Sciences < UTEP](#)) that includes Physical Therapy, Health Promotion, Occupational Therapy, Speech-Language Pathology, and Kinesiology, as well as Public Health.

Similarly, at the University of Alabama-Birmingham (http://catalog.uab.edu/graduate/ and [Interdisciplinary Engineering (PhD) < Catalog | The University of Alabama at Birmingham (uab.edu)](#)) there is an Interdisciplinary Engineering PhD program that draws upon strengths of the five departments in the School of Engineering: Biomedical Engineering; Civil, Construction, and Environmental Engineering; Electrical and Computer Engineering; Materials Science and Engineering; and Mechanical Engineering. Students enrolled in the Interdisciplinary Engineering PhD program gain the skills to succeed as independent and productive investigators in multidisciplinary analysis and design, with applications over a wide spectrum of science, engineering, health, and medical fields.

The PhD Program in Biomedical Sciences at the University at Buffalo ([PhD Program in Biomedical Sciences - PhD Program in Biomedical Sciences - University at Buffalo](#)) provides an entry portal and a common first-year curriculum, equipping students with core knowledge and concepts to support pursuit of a doctoral degree in one of several participating disciplines: Biochemistry, Biomedical Engineering, Biomedical Informatics, Genetics, Genomics and Bioinformatics, Microbiology and Immunology, Neuroscience, Oral Biology, Pathology and Anatomical Sciences, Pharmacology and Toxicology, Physiology and Biophysics, and Structural Biology.

3.3 Review and Recommendations: Confronting Challenges

As previously mentioned, the UMKC IPhD Program was created as a result of a University of Missouri System requirement to avoid duplication of programs that existed at the flagship institution. The moniker, IPhD, has been a source of confusion to applicants, funders and employers. Recently the UMKC School of Graduate Studies was able to change the name of the degree that appeared on the diploma from IPhD to PhD. Nevertheless, the organizational structure still reflects the fact that the IPhD program is a collection of 30 disciplinary PhD programs with an interdisciplinary label added to the PhD degree. That label, in some situations, is effective at achieving the educational goals of the degree and in some cases, that label is a major hindrance to graduate student training.

There are four major challenges to the UMKC IPhD program. These include 1) declining application numbers and low enrollments; 2) low degree award numbers; 3) programming that does not align with the UMKC *Research Forward* initiative; and 4) practices for achieving interdisciplinarity.

The UMKC School of Graduate Studies provided the consultants with application, enrollment and degree completion data that indicates there has been a 37% decrease in applications over the last 5 years. Some of the disciplines in the IPhD Program, such as Chemistry, Computer Science and Economics, have maintained relatively consistent application numbers. Surprisingly, disciplines such as Electrical and Computer Engineering, Molecular Biology and Biochemistry and Pharmacology have seen a decreasing or steady low application pool. Some disciplines in the IPhD had no applicants in 2021. Other disciplines such as Oral and Craniofacial Sciences have only had 3 applicants in the last 5 years, suggesting that perhaps the discipline as a PhD program is too narrow in focus. Despite declining application numbers, the disciplines admit a fairly constant number of applicants and subsequently enroll a constant number of new students. Since there is no reliable proxy measurement for PhD student potential, it is difficult to assess whether the admission processes in the IPhD disciplines have yielded less qualified students over the period of declining applications. One of the major concerns with the low enrollment numbers is an effect on the cohort-dependent aspects of PhD education. With new enrollments of one or two students in some of the disciplines, it is difficult to imagine how a vibrant educational environment can be achieved. During the site visit, the

consultants heard a number of concerns from the faculty regarding marketing of the IPhD program and the external perspective of whether the IPhD was as rigorous as the traditional PhD or whether it was a different entity. Some faculty indicated this has affected international funding for PhD students.

Similar to the challenges of low and declining applications numbers is the overall low PhD degree award numbers for many of the disciplines. In the past seven years, there are many examples of disciplines in the IPhD Program that graduate one or no students in a given year. Moreover, the outcomes of the graduates in terms of career sector, career type and job function are not systematically tracked, thus making it difficult to assess whether the low number of graduates are achieving their desired careers. The time to degree for those completing the IPhD appears to be elevated.

The *UMKC Forward* initiative seeks to enhance both research and education by realigning and restructuring units to match funding and investment opportunities. This effort has already resulted in the sunsetting of one of the IPhD disciplines. One of the major challenges facing the IPhD program is that its structure does not readily align with the *UMKC Forward* initiative. For example, some of the IPhD disciplines would like to separate from the IPhD and be stand-alone PhD programs, following a more traditional departmental based approach because of the growth in their research areas with the corresponding enhanced ability to support PhD students.

Interdisciplinarity in the IPhD program is achieved through two main modalities: students taking courses outside their main discipline and inclusion of faculty from another discipline on the thesis advisory committee. The consultants heard from a number of faculty members and some students that this structure results in unevenness in achieving interdisciplinarity as it is dependent on the engagement and commitment of both the student and the faculty members. Moreover, it does little to inject interdisciplinarity into the dissertation research approach. The consultants met with a number of individuals who indicated that the best interdisciplinarity occurs organically when students and advisors seek expertise to solve research problems as they arise during the course of the project.

3.4 Review and Recommendations: Organizational Structure

One of the goals for this consultation was not to provide a single recommendation which could have the effect of constraining UMKC leadership, rather, the consultants took the approach of considering multiple options to promote change. Applying this guideline still required that the first recommendation focus on changing the IPhD moniker. The consultants heard during the site visit that the IPhD name was confusing to applicants, funders and employers. The consultants agree with this assessment. Moreover, the IPhD name has the connotation of being something different than what most participants in doctoral education recognize as the PhD degree. Additionally, retaining the current IPhD structure and list of participating disciplines without making a change, while a distinct possibility, is not recommended. Regardless of whether structural changes are made, the consultants recommend that the School of Graduate Studies perform an extensive marketing analysis of the existing disciplines that constitute the current UMKC IPhD Program. The analysis will ascertain how well applicants are informed about PhD educational opportunities at UMKC. The analysis will also ascertain how well the School of Graduate Studies website contains information that applicants find useful in making decisions, and whether the available information to applicants highlights existing research strengths and future areas of investment and expansion.

Additionally, it would be useful for the School of Graduate Studies to acquire information from the National Student Data Clearinghouse on cross-admitted applicants to compare peer and aspirational institution student admission and enrollment. This is sometimes called the "win-loss" analysis and has the ability to provide insight into whether UMKC is competitive with peer institutions in terms of enrolling PhD students. The analysis would further support whether an admitted student survey methodology would be useful to ascertain reasons why or why not students decided to enroll at UMKC. These types of analyses have the ability to provide rationale for marketing decisions designed to boost enrollment as *UMKC Forward* changes the overall research and teaching mission. Regardless of the organizational change possibilities outlined below, PhD student funding package improvement (mentioned in detail earlier in this report) is necessary to address the challenges of low application/enrollment numbers as well as align the graduate education

enterprise with the *UMKC Forward* initiative designed to accelerate and elevate research at the university.

The first re-organizational possibility that the consultants will discuss is disbanding the IPhD structure and allowing for separate disciplinary PhD programs. This decision would entail a number of additional considerations, including whether those PhD programs would be housed in the departments that have been reorganized into new schools through the *UMKC Forward* initiative or retained in the central School of Graduate Studies. An additional consideration would be whether to sunset low enrolling/degree awarding programs. An advantage for this overall approach would be that those PhD disciplines that are aligned with departments whose faculty and research portfolio is growing would have the ability to meet applicant and workforce demand. Correspondingly, those programs where there is little applicant demand would be discontinued and limited resources could be refocused. Overall enrollment management oversight could be retained by the School of Graduate Studies in the form of a centralized electronic application and review process as well as elements of a centralized PhD support allocation process. Another advantage to this approach would be to remove the artificial interdisciplinarity constraint on students that has taken the form of additional coursework. The interdisciplinary component of contemporary PhD education could be maintained in the form of research collaboration and mentoring committees of disciplinarily diverse faculty.

Another organizational possibility would be to create cluster PhD programs (e.g., Humanities PhD, Engineering PhD, Natural Sciences PhD, Biological Sciences PhD, and Social Sciences PhD) with disciplinary specificity added to the student record through the use of named options (e.g., English, Chemistry, Biochemistry, and Economics). There are several advantages to this re-organizational approach, the first of which is constructing clusters to group graduate faculty in such a way that would enhance recruitment of students and result in enrollment of larger cohort sizes. For example, using current data a Biological Sciences PhD cluster in fall 2021 would have had 41 applicants, 13 admits and 11 new enrollments, thus providing a richer cohort educational experience than can be achieved by enrolling 1 or 2 new students in each of the disciplines. Depending on how the clusters were constructed, another advantage would be the ability to configure meaningful interdisciplinarity at the research approach level. The cluster organization would also

present an opportunity to group similar disciplines such that students could more easily determine the best disciplinary and research fit for themselves after doing multiple "rotations" or mini-immersions. Arguably, this is an attractive feature of modern graduate education programming and was mentioned as desirable among some faculty and administrators who met with the consultants during the site visit. One of the primary features of the cluster organization is its research-focused, rather than course-based, approach on graduate education and would thus align better with the goals of *UMKC Forward*. Another potential feature of a cluster PhD organization in STEM disciplines involves elevating the institutional competitiveness for National Science Foundation Research Traineeship (NRT) grants that could markedly enhance graduate education at UMKC.

The third overall possibility for organizational change would be to keep some PhD programs that align with *UMKC Forward* as individual entities that are department-based (e.g., English) and create umbrella or cluster programs for those where that makes particular recruitment and training sense. For example, derive a new Biomedical Sciences PhD program from the existing IPhD disciplines that include Biomedical and Health Informatics, Cell Biology and Biophysics, Molecular Biology and Biochemistry, Oral and Craniofacial Science, Pharmaceutical Science, and Pharmacology . This hybrid approach would require a number of additional decisions. These include, but are not limited to, determining the administrative home of the cluster/umbrella programs and creating core curricula that meets the training, research and professional development needs of students for a diverse career outcome. Additional decisions include designing PhD student funding strategies that are market based and integrated within the extramural research grant environment. As mentioned earlier, the cluster or umbrella organizational approach has been particularly dominant in national biomedical PhD programming and has served students well toward the goals of skill set development for career outcomes inside and outside of academia.

Finally, the discussion about IPhD restructuring at UMKC should be grounded in the principles outlined by the National Academies of Sciences, Engineering and Medicine report titled "Graduate STEM Education for the 21st Century" released in 2018 (ISBN 978-0-309-47273-9; DOI 10.17226/25038). The report emphasizes a shift from graduate

program structures that focus primarily on the needs of institutions of higher education and those of the research enterprise to one that is student centered, placing greater emphasis on graduate students as individuals with diverse needs and challenges. Although the report was written for graduate education in STEM disciplines, many of the principles are applicable to the humanities as well as the humanistic social sciences.

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List of Attachments

Attachment 1. Appendix 1 Pharmaceutical Sciences Sample Emsi Report.

Attachment 2. Appendix 2 Sample First Year Survey

Attachment 3: Appendix 3 Sample Exit Survey

References

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