# Teamwork Makes the Dream Work: Strategies for Successful Interdisciplinary Collaboration and Research (IDCR) in Kinesiology

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The field of Kinesiology has evolved in many ways, from preparing effective physical educators and coaches to preparing pre-rehabilitation sciences students (e.g., physical and occupational therapy, chiropractic, and physician assistant studies). Throughout our evolution, we have led the charge in developing interdisciplinary departments that engage professors in a wide variety of academic disciplines. Given our need to continue to evolve, and embrace the promise that interdisciplinary collaboration and research (IDCR) hold to help bring our discipline together, the purpose of this paper is to: (a) define and clarify terms; (b) discuss reasons why Kinesiology should engage in and lead IDCR; (c) present some challenges with IDCR; (d) make some suggestions for successful IDCR; (e) propose 4 dimensions for IDCR in Kinesiology and provide some examples of each (e.g., Health & Medicine, Technology & Data Science, Education & Community Engagement, and Business & Industry); and (f) and suggest some future directions for IDCR.

*Keywords:* team science, interprofessional, cross-disciplinary, translational research, knowledge integration

What are some of the biggest challenges facing Kinesiology today? When I asked ChatGPT to respond to that question, some interesting topics came to the forefront (OpenAI, personal communication, October 12, 2025). Note that the topics were generated by AI; the text that follows each topic is my own:

*Defining the scope and finding our identity.* We DO have an identity crisis in Kinesiology, and it makes it difficult to brand ourselves, facilitate understanding of what we do, collaborate amongst ourselves, and importantly, it makes it difficult for students to find us because we have so many different names (e.g., exercise science, physical education, sport science, kinesiology, etc.) (Newell, 1990). Unfortunately, the fragmentation in our disciplinary names can mirror fragmentation within our disciplines and departments. Should we take a page from Biology, Chemistry, or Psychology and commit to a common name?

*Program sustainability.* Amid the challenges facing higher education today, we need to find ways to remain viable. One thing that should bolster our viability is that virtually everyone benefits from learning to move their body efficiently and effectively. For example, it is hard (and potentially dangerous) for people to learn how to perform a clean and jerk powerlifting move without progressions and coaching.

*Funding and resource constraints.* We live in a world where every university is seeking ways to grow resources and justify spending amid budget cuts. Working together and bringing multiple disciplines to the table should lead to better decision-making and more sustainable, viable programs.

*Professional pathway ambiguity.* Students sometimes struggle to find secure job opportunities, and many programs that Kinesiology students pursue are overcrowded (e.g., personal training, group exercise instruction, strength & conditioning). Therefore, it is important to train students for a variety of career opportunities, so they can make decisions about their future from an interdisciplinary perspective.

*Adapting to technological and data-driven change.* Our field is changing quickly, with AI, new wearables, motion capture, and data analytics software now available. We need to produce students who think critically and have malleable skill sets – so they can adapt to these changes. We also need to learn to use AI productively to facilitate high-level teaching and learning.

*Teacher education and physical literacy decline.* There are

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fewer students pursuing physical education teaching careers at a time when this generation may be the first that might not outlive their parents due to high obesity, hypokinetic disease, and inactivity rates. Finding ways to offer career-savvy training in multiple areas of teaching is key to the success of teacher education. At our university, the pedagogy faculty also advises students to make sure they stay on track for success and ultimately, graduation.

*Ethics in human performance and data analytics research.* Given the financial potential and the desire to produce the best athletes possible, ethical issues have arisen in the collection of data for human performance research (e.g., Who controls the data?; Are the data private?; and Do algorithms show bias?).

*Interdisciplinary and interprofessional collaboration.* Yes, ChatGPT came up with this one, and the challenges to be addressed in this article include departmental silos and discipline-specific vocabularies and methodologies. There is clearly a need to continue to develop interdisciplinary collaboration within Kinesiology.

Now that we have a list of the most challenging problems facing Kinesiology today, what if we could bring together the best minds to solve them? THIS is exactly the premise of this paper; we need to enhance our collaborative and interdisciplinary work. We need to work smarter together versus harder independently. Given the need to enhance interdisciplinary collaboration and research (IDCR), and to address the most challenging issues facing Kinesiology and beyond, the purpose of this paper is to: (a) define and clarify terms; (b) discuss reasons why Kinesiology should engage in and lead IDCR; (c) present some challenges with IDCR; (d) make suggestions for successfully implementing IDCR; (e) propose 4 dimensions for IDCR in Kinesiology and provide some examples of each (e.g., Health & Medicine, Technology & Data Science, Education & Community Engagement, and Business & Industry); and (f) suggest future directions in IDCR.

### Defining Terms

To best understand the purpose of this paper, it is important to draw on colleagues' work to define interdisciplinary collaboration, research, and related terms. These terms are often used interchangeably, and I advocate that careful consideration should be given to all terms so that the most appropriate term(s) can be used in each situation.

Table 1 summarizes terms related to interdisciplinary collaboration and research.

Clearly, there is overlap between terms, and there are times when any of the terms in Table 1 can be used. For example, some challenges lend themselves to disciplinary focus, whereas others can benefit from multidisciplinary, transdisciplinary, and interdisciplinary collaboration and research. Interprofessional education and practice are formalized and applied to improve the quality of healthcare practice within health-related disciplines, and there is research to support the use of IPE and IPP; specifically, students and medical professionals can benefit from understanding other professional roles (i.e., scope of practice), practicing teamwork, and learning about conflict resolution; patients can benefit from reduced errors, and they report enhanced satisfaction (Zenani et al., 2023).

Importantly, the U.S. National Academy of Sciences (2005) defines interdisciplinary research as: "A mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from 2+ disciplines to advance fundamental understanding or to solve problems where solutions are beyond the scope of a single area of research practice." According to Newman (2023), interdisciplinarity can be further broken down into collaborator interdisciplinarity and project interdisciplinarity. Because Kinesiology is an interdisciplinary field by its nature, it is vital that we work together, avoid fragmenting or de-valuing disciplines, and seek ways to enhance IDCR.

### Why Should Kinesiology Participate in Interdisciplinary Collaboration and Research? What Are the Benefits?

Arguably, the most important reason Kinesiology professionals should engage in IDCR is that we are already interdisciplinary, and with enhanced interdisciplinary collaboration and research, we can provide more comprehensive and effective solutions to complex problems (Brown et al., 2023). Our world is becoming increasingly complex, and solving problems is becoming a more desirable job skill. Research suggests that solving problems from an interdisciplinary perspective yields more creative and successful solutions, and it facilitates "buy-in" from a larger number of individuals (Stvilia et al., 2010).

Another reason why engaging in IDCR is important is that it advances our field. Ideally, it provides individuals from disciplines outside kinesiology with a new lens through which to respect Kinesiology, given our breadth and expertise in human movement. IDCR can also lead to shifts in disciplinary perspectives, resulting in the creation of something new (Vladova et al., 2025; Yang & Heo, 2014). Finally, individuals who participate in IDCR report feeling very satisfied with their work, including "relational dynamics which promote dissemination of knowledge across a broad range of research fields" (Yang & Heo, 2014, p. 734).

### What are Some Challenges with IDCR?

In addition to the reported benefits of IDCR mentioned in the previous section, challenges exist. One of the main challenges is that IDRC operates in contrast to a siloed academic discipline paradigm, in which academic success is typically defined as independent scholarship rather than collaboration (Vladova et al., 2025). A second challenge is the use

**Table 1:** *A summary of terms related to interdisciplinary collaboration and research*

| Term | Definition | 1 word summary *from Vladova et al. (2025) |
|---|---|---|
| Disciplinary | Knowledge flows within discipline and does not integrate much with other disciplines Vladova et al., 2025 | siloed* |
| Multidisciplinary | Knowledge that combines disciplines and methods Burns & Collins, 2023; Vladova et al., 2025 | additive* |
| Transdisciplinary | Knowledge that goes beyond, through and across Burns & Collins, 2023; Vladova et al., 2025 | holistic* |
| Interprofessional Education (IPE) | Education specific to healthcare disciplines where 2+ professions learn about, from, and with each other to enable effective collaboration and improve health outcomes WHO, 2010 | education |
| Interprofessional Practice (IPP) | Healthcare practice where multiple workers from different professional backgrounds work together with patients, families, carers, and communities to deliver the highest quality of care WHO, 2010 | practice (Think Mayo Clinic) |
| Interdisciplinary | Knowledge that makes connections between, among, and reciprocal Burns & Collins, 2023; Vladova et al., 2025 | interactive* |

of different terminology, writing styles, evaluation, and statistical analyses across disciplines (Newman, 2023; Vladova et al., 2025). Table 2 presents examples of differences in disciplinary language between Kinesiology and Public Health. These disciplinary differences can lead to communication difficulties and conflict unless participants in IDCR work hard to learn about other disciplines and to communicate regularly and effectively.

A third challenge of IDCR is that it is hard to find information about interdisciplinary research and conducting IDCR projects because it is conducted within a variety of academic disciplines, published in different journals, and there is not much existing research on strategies to conduct IDCR (Newman, 2023; Vladova et al., 2025). In addition, within Kinesiology, disciplinary power struggles and hierarchies can occur, and if faculty are in different buildings, geographic challenges may arise.

**Strategies for Success with IDCR**

Although there are challenges with IDCR, several approaches can be used to ensure successful outcomes. Below are some recommended strategies combined from papers by Brown et al. (2023) and Burns and Collins (2023). These strategies can and should be utilized as a proposed framework of action for Kinesiology.

Most importantly, it is essential to identify and define the problem using terminology that makes sense to all participating disciplines. Once the problem is identified, it is easier to determine a future course of action. Secondly, the expertise needed to solve the problem should be identified. One recommendation is to do an "aptitude test" for prospective team members. In other words, in addition to choosing team members for expertise, examine their skills in team collaboration, passion for interdisciplinary work, and willingness to learn about other disciplines (i.e., "intellectual humility") (Vladova et al., 2025). Once team members are identified, it is vitally important to develop a collaborative culture. That includes busting down silos and hierarchies, building shared goals and language (i.e., working together on issues), having respect and appreciation for all team members, facilitating regular communication, compromising when necessary, and completing assignments in a timely fashion. Next, it is important to develop a vision or framework for problem-solving. This should be done with all team members involved in discussions and should include examining the logistics and processes required. For example, when multiple individuals are sharing data and working on a project, authorship order, roles/responsibilities, and data control should be identified and ideally, included in an MOU. Lastly, it is important to identify the key performance indicators (KPIs), which are outcome metrics that determine a project's level of success.

**Table 2:** *Examples of differences in disciplinary language between Kinesiology and Public Health*

| Concept | Kinesiology Terms | Public Health Terms |
|---|---|---|
| Population/Unit of Focus | Athlete, Patient, Participant | Population, Community, Vulnerable Group |
| Health Outcomes | $VO_2$max, Lactate Threshold, Muscle Strength, Flexibility | Morbidity, Mortality, Quality-Adjusted Life Years |
| Measurement/Data | Gait Analysis, EMG, EEG, Metabolic Cart, DEXA | Surveillance, Prevalence, Incidence, BRFSS |
| Statistical Analyses | ANOVA/ANCOVA, Correlation Matrix, Regression Analysis | Odds Ratio, Relative Risk, Hazard Ratio, Sensitivity, Specificity, Cox Proportional Hazard, Hierarchical Models |

## Four Dimensions of IDCR in Kinesiology

Although there could be many examples of IDCR projects featured in this section, Table 3 lists four (4) specific dimensions in which IDCR occurs—with examples: Health & Medicine, Technology & Data Science, Education & Community Engagement, and Business & Industry. Table 3 also summarizes some examples of problems to address, potential collaborators, and solutions. The narrative following the table describes some examples of IDCR in which I have participated (Technology & Data Science) and illustrates how each of the strategies for success described in the previous section is used.

As an example of a progression of IDCR projects related to Technology and Data Science, I have collaborated with Teena Murray, a high-performance coach with 20+ years of experience. She has worked with athletes at the Collegiate level, in the NBA and NHL, and with USA Women's Hockey; she is currently with USA Soccer. Dr. Yong Gao, the most talented statistician and data analyst I know, was also a collaborator. We discussed several problems we wanted to solve, related to female athletes – a dramatically understudied population. Through the 3 examples that follow, we identified a problem, recruited the expertise needed, developed a collaborative culture and prioritized our ability to work together, provided a framework for solving problems, and lastly, identified KPIs (otherwise known as dependent variables).

We started with a simple physical profile of the USA women's hockey team (L. B. Ransdell & Murray, 2011). Teena was the performance coach for USA hockey, and we wanted to publish aggregate physical test data (e.g., vertical jump, long jump, 1RM front squat and bench press, front squat and bench press relative to body mass, pull ups, and body composition) from the U.S. team to help other countries seeking to join the USA and Canada at the highest echelon of women's hockey. From a skill and strategy perspective, teams were making in-roads. We wanted to provide information on these athletes' physical capabilities so they could advance to the next level of competition on the world stage.

Continuing along the lines of publishing physical profiles of elite female hockey athletes, we then examined physical performance test data from a "High Performance Camp" in Bratislava, Slovenia, where 204 elite female ice hockey athletes from 13 countries met to discuss hockey training strategies (L. Ransdell et al., 2013). In this study, athletes were tested on the vertical jump, long jump, 4-jump average, elasticity ratio (4-jump average/vertical jump), pull-up or inverted row, aerobic fitness, body mass, and body composition. Physical variables were examined relative to: (a) team success in major international hockey competition during the past decade (e.g., Group 1 = USA & Canada [Gold and Silver medal winners]; Group 2 = Sweden & Finland [Bronze medal winners]; Group 3 = all other participating countries), (b) age group (U18 and Senior/Open), and (c) player position (forward, defense, or goalie). Not surprisingly, compared to their less successful counterparts, athletes from the USA and Canada weighed more (yet had less body fat), had greater lower-body muscular power and upper-body strength, and higher aerobic capacity. Compared with U18 athletes, Senior/Open athletes had higher scores in lower-body power, pull-ups, and aerobic capacity. Interestingly, no statistically significant differences existed by player position.

After addressing a series of questions related to elite female hockey athletes, we turned to using technology and Catapult data to longitudinally examine player game data for a perennial powerhouse women's basketball team (0.817 win percentage) over a 4-year period (L. B. Ransdell et al., 2019). We examined workload (e.g., PlayerLoad, PL.min^{-1}, high inertial movement analysis [high-IMA], and jumps) by (a) season, (b) player position, and (c) game outcome (wins vs. losses). Important findings included that: (a) jumps increased across the 4-year period (indicating that training improved game capacity to jump); (b) PL.min^{-1} was higher for guards compared to posts (indicating that practice loads and games should be monitored and adjusted accordingly), and that high-IMA was higher in losses compared to wins (possi-

**Table 3:** *Examples of Interdisciplinary Collaboration & Research in Kinesiology*

| Area of Collaboration | Potential Collaborators | Problem to Address | Solution |
|---|---|---|---|
| Health & Medicine | Exercise Physiologist, Data Scientist, Engineer, Sport Sociologist | Improve sleep & recovery habits of athletes Bigalke et al., 2025 | Use sleep monitoring devices to measure sleep quality and quantity and how that relates to performance; could also measure HR variability, resting HR, and body temperature |
| | Biomechanist, PT/OT, Engineer, Psychologist, Motor Movement Specialist | Recover mobility after a stroke Calafiore et al., 2021 | Develop an exoskeleton to restore mobility, improve muscle activation, and enhance quality of life |
| Technology & Data Science | Biomechanist, Exercise Physiologist, Sport Scientist, Psychologist, Sport Philosopher | Lower injury rate & burnout and improve athlete performance Eitzen & Yetis-Bayraktar, 2021 | Measure workload with wearable sensor; adjust training accordingly; add force sensors to gather information about shock impact |
| | Biomechanist, Computer Scientist, Physical Therapist, Athletic Trainer | Prevent ACL tears Schulc et al., 2024 | Use automated video analysis to identify biomechanical patterns associated with ACL injury |
| | PT/OT/Rehab, Virtual Reality Experts, Neuroscientists | Reach rural patients and gamify PT environment Bateni et al., 2024 | Use VR with patients to gamify PT experience, and enhance motivation and adherence |
| Education & Community Engagement | Exercise Scientist, Community Planner, Epidemiologist, Adaptive PE Specialist | Study walking and cycling patterns and accessibility Baraka-Munyaka & Mhlongo, 2023 | Use smartphone/devices and geolocation to study trail use; improve urban planning for walkable/bikeable neighborhoods |
| | PE Student Teachers, PE Teachers, Adaptive PE Teachers, Strength and Conditioning Specialists | Need more practical experience for student teachers Egan et al., 2024 | Partner with area schools to bring children to colleges to work with aspiring PE teachers |
| Business & Industry | Public Health, Tribal Nations, Non-Profit Organizations, Health Promotion Specialists | Needs analysis to determine most important health equity issues in Northern Arizona Sabo et al., 2020 | Surveyed 136 non-profit health organizations and tribal nations about health challenges; recommended infrastructure & collaboration to address top 10 health issues |

bly indicating a frenetic reaction to losing, or indicating that an opponent with high-level skills and fitness demanded more effort). Findings can also be used to set expectations for the player and the team regarding game workload.

The aforementioned examples are proof positive that combining individual expertise and passion for a specific area can move the needle beyond what any one individual can accomplish. The combination of our expertise enabled us to publish papers that advanced female athletic performance and sport science.

**Future Directions for IDCR**

This paper would not be complete without including some future directions for IDCR. These examples are based on my

**Table 4:** *Potential future strategies for enhancing IDCR and solving complex problems*

| Type of Analytic Strategy | Uses | Strengths of Strategy | Challenges of Strategy |
|---|---|---|---|
| Use AI to enhance IDCR team success | Assign roles, responsibilities, outcomes of project based on personalities, strengths, and skills of team members | Saves time; enhances creative solutions | AI doesn't know team members |
| Analytic Hierarchy Process (AHP) Li et al., 2024 | Organize and analyze complex decisions using math and psychology; weight decision criteria through pairwise comparisons | Saves time; enhances creative solutions | Inconsistency in dealing with complex interactions among criteria |
| Analytic Network Process (ANP) Li et al., 2024 | Extends AHP in analyzing interdependence among elements | Suitable for more complex decisions | Pairwise comparisons can be time consuming & cognitively demanding |
| Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) Li et al., 2024 | Given a finite set of solutions, identifies solutions based on geometric distance from the ideal solution | Good for linear decisions | Limited efficacy for interdependent decision criteria or with feedback loops |

own experiences in Kinesiology over the past 30 years and from reading several papers on IDCR. First and foremost, we need to continue examining the best ways to teach our students to think about their specialization areas, as well as how to conduct and participate in IDCR. This will take a village, with a healthy dose of intellectual humility and work to understand all of the disciplines that encompass Kinesiology.

Second, if we return to the top problems in Kinesiology identified at the beginning of this paper, conducting research to address them from an interdisciplinary perspective would be immensely beneficial. How do we lessen our identity crisis? How can we make our programs and discipline more sustainable? Can we operate more efficiently in this climate of funding and resource constraints? Are there ways we can enhance clarity around professional pathways for our students? Are there ways to advance the teaching profession and facilitate enhanced physical literacy in a world that increasingly relies on technology and a sedentary lifestyle?

Lastly, I would advocate for studying ways to utilize Artificial Intelligence to enhance our field.

## Conclusions

No single discipline holds the key to improving human health. Interdisciplinary collaboration and research are essential to move our world forward. Using physical activity as a hub for improving health enables individuals from Kinesiology to shine and collaborate to improve life expectancy AND quality of life. It is important to remember that "Interdisciplinary success does not just happen when a group is placed together. It requires commitment from everyone and solid direction from leaders;" in addition, we are reminded that "The true power of interdisciplinary research lies not in merging disciplines into one, but in fostering the kind of enthusiasm and interaction that allows each discipline to inform and enrich the others" (Lane & Kreider, 2025, p. 1). It is my hope that this paper provided some inspiration, ideas, and strategies for enhancing IDCR within Kinesiology.

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