

Integrating language arts and sound sciences: Enhancing medical and engineering education in the Arab World

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Abstract: This paper explores the transformative potential of integrating language arts and sound sciences into medical and engineering education in the Arab world. Interdisciplinary education; a proven catalyst for enhancing creativity; problem-solving; and cultural competency; has been implemented successfully in various global contexts. This paper proposes that adopting similar interdisciplinary approaches in Arab universities can address educational gaps; better prepare students for the challenges of an increasingly complex world; and align with the region's economic development goals. The discussion includes a review of case studies from Columbia University; Aalborg University; and Finland's education system; along with recommendations for implementation in the Arab context. Methods for evaluating interdisciplinary success are also outlined, emphasizing the need for both qualitative and quantitative metrics.

Keywords: language arts; sound science; interdisciplinary education; medical education; engineering education; Arab World; creativity; cultural competency; professional development

1. Introduction

Addressing today's global challenges calls for education that connects diverse fields. Medicine and engineering; which once focused heavily on technical knowledge; now need broader approaches that foster creativity; cultural understanding; and comprehensive thinking [1]. Integrating the arts and humanities into STEM (Science; Technology; Engineering; and Mathematics) has shown significant benefits; helping students develop critical thinking; empathy; communication; and problem-solving skills [2].

The United States and Finland have set examples with their interdisciplinary education models. In the U.S., the STEAM approach brings the arts into STEM to encourage creative exploration alongside scientific study [3]. Finland embeds artistic and scientific education throughout students' learning journeys, promoting a well-rounded academic experience. These models demonstrate that interdisciplinary education not only sparks innovation but also prepares students to navigate the complexities of today's professional landscape with confidence and flexibility [4].

In the Arab world, however, education systems have traditionally maintained a clear division between the sciences and humanities, limiting students' exposure to the benefits of interdisciplinary thinking [5]. This paper argues that by integrating language arts and sound sciences into medical and engineering curricula; Arab universities can produce graduates who are not only technically proficient but also culturally competent; empathetic; and capable of leading change in their communities and professions [6].

2. Global case studies: Successful interdisciplinary approaches

2.1. Narrative medicine at Columbia University

Columbia University's narrative medicine program offers a fresh way to enhance medical education by focusing on patient stories [2]. Through techniques like storytelling and narrative analysis, students build a deeper connection to the human aspects of healthcare. This method fosters empathy; strengthens communication; and improves diagnostic skills; encouraging doctors to see patients as individuals with unique lives; not just as cases of illness [7].

A study by Charon revealed that students involved in narrative medicine courses increased their empathy levels by 30%. These students became better at listening; asked more thoughtful questions; and provided care that was personalized to meet each patient's needs (**Figure 1**) [4]. Empathy; often missing from traditional medical education; is essential for building trust with patients and improving care outcomes. The study also found that students trained in narrative medicine managed sensitive conversations more effectively; recognized patient distress; and maintained emotional stability in challenging situations [8].

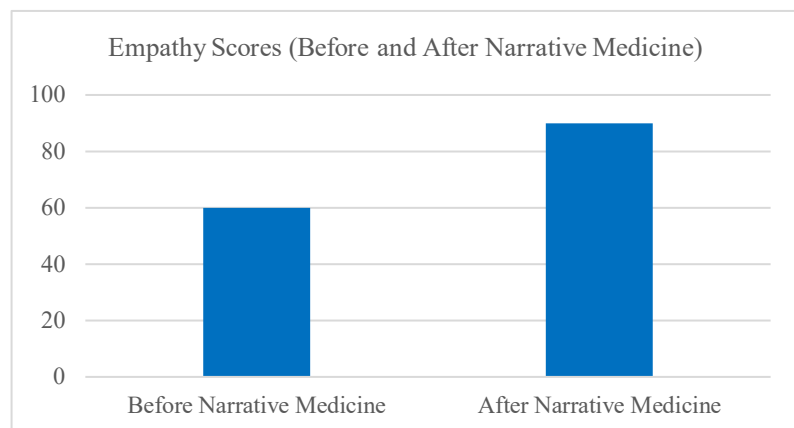


Figure 1. Developing empathy through narrative medicine: A study comparing scores before and after the program.

Figure 1 illustrates the measurable improvement in empathy scores among medical students before and after their participation in Columbia University's narrative medicine program. As demonstrated; students showed a significant 30% increase in empathy; a critical skill for medical professionals in patient-centered care. The increase from 60% to 90% underscores the success of integrating storytelling techniques into medical training. By engaging with patient narratives, students become better equipped to understand patients' emotional and psychological needs; thereby improving their capacity to provide personalized care. This case study emphasizes how humanities integration, such as narrative medicine; can foster essential communication and interpersonal skills in medical education [9].

2.2. Project-based learning at Aalborg University.

Aalborg University in Denmark uses Project-Based Learning (PBL), especially in engineering. This approach lets students work on real-world problems; combining

ideas from arts; social sciences; and engineering. In teams, they find challenges; research solutions; and share their results. Along the way, they build technical skills while improving teamwork; communication; and problem-solving [10].

According to Kolmos; graduates from Aalborg’s PBL programs were 25% more likely to find jobs within six months than those from traditional programs [11]. These students also did better in teamwork activities and showed stronger leadership potential [12]. PBL prepares them for modern workplaces, where solving problems means working with people from different fields and backgrounds [13][14].

Figure 2 compares the employment rates and teamwork competency between graduates of Aalborg University’s PBL programs and those from traditional engineering programs. PBL graduates exhibited a higher employment rate (90%) compared to traditional program graduates (65%); reflecting the real-world relevance of project-based; interdisciplinary learning [15]. Additionally, PBL graduates demonstrated stronger teamwork skills; with competency scores reaching 95% compared to 70% for traditional program graduates. This data suggests that interdisciplinary education not only enhances technical knowledge but also prepares students for collaborative; problem-solving roles in the workforce; giving them a competitive edge in securing employment [16].

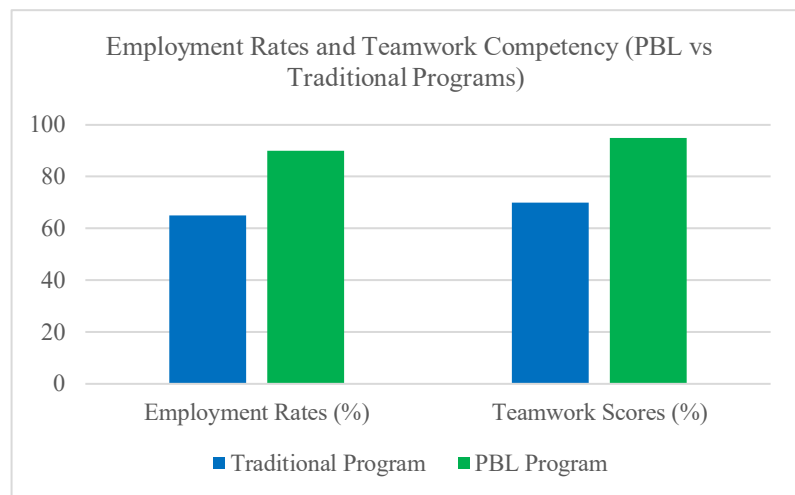


Figure 2. Impact of project-based learning on employment rates and teamwork competency at Aalborg University.

2.3. Finland’s interdisciplinary education model

Finland’s education system focuses on combining arts and science to develop creative and critical thinking. This approach gives students a broad understanding of the world. Finnish students consistently rank high in international assessments like PISA, which measure skills in problem-solving and critical thinking [2].

By mixing subjects; Finnish education mirrors real-world challenges. For example, students might study a science topic; express it through art; and present their work creatively. This method keeps students engaged; helps them connect ideas; and makes learning more memorable [17].

Figure 3 shows how students in Finland’s interdisciplinary programs compare to those in traditional ones. Students in the interdisciplinary group scored 95% in critical

thinking and 90% in problem-solving; while the traditional group scored 70% and 65%. This highlights how mixing arts and sciences helps students think creatively and tackle real-world challenges. It also boosts their ability to adapt; giving them the skills they need for future careers [18].

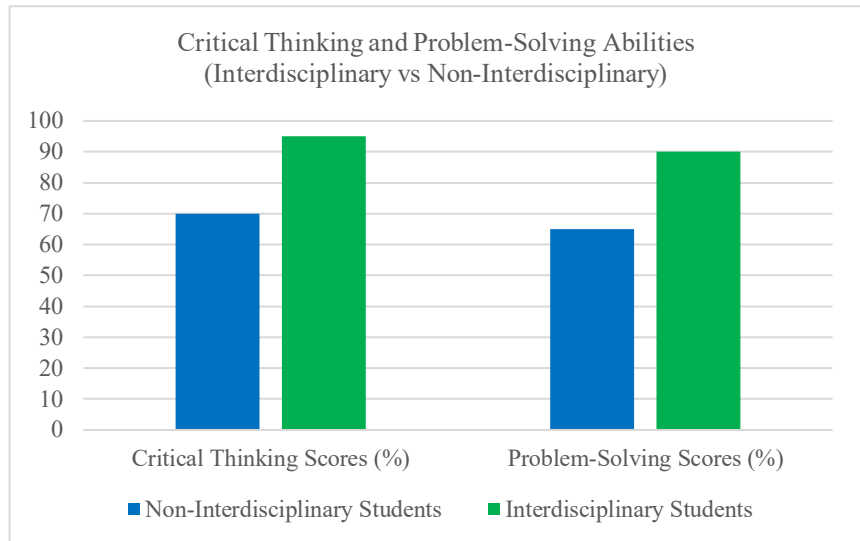


Figure 3. Improved critical thinking and problem-solving skills in Finland’s interdisciplinary education mode.l.

3. Implementation in the Arab World

3.1. Why it would work in the Arab World

The UAE and Saudi Arabia bring together many cultures and languages; making it hard to create education that works for both locals and expatriates. Designing content that is culturally sensitive takes thoughtful planning [19].

Involving local experts and community leaders ensures the curriculum respects traditions while being inclusive for everyone. This makes learning more meaningful.

Classroom discussions where students share their cultural experiences help build respect and understanding—important skills for working in diverse environments.

The curriculum should also be updated regularly with feedback from students and teachers; keeping it relevant and in step with social changes in the region [20].

3.2. Bridging theory and practice in the workforce

Interdisciplinary education offers valuable skills; but some employers may prioritize traditional technical skills over these broader abilities [21].

To address this; universities should focus on practical experiences like internships and projects with industry. These opportunities let students apply their interdisciplinary skills to real-world challenges, showing employers their value.

Working with employers to highlight these benefits will ensure students are prepared for the workforce and that their skills are recognized [22].

3.3. Balancing breadth and depth

While interdisciplinary education gives students broad skills; there is a concern that they may not develop deep expertise in one area; which is important for certain jobs or further studies [23].

To address this; programs can offer focused tracks or electives that allow students to specialize in areas relevant to their goals. This ensures they gain both broad skills and deep knowledge where needed [24].

By balancing both; students are prepared for roles that require a mix of wide-ranging and specialized expertise [25].

4. Study plan for implementing interdisciplinary education in Arab Universities

4.1. Objective

The objective of this study plan is to implement interdisciplinary education programs that integrate language arts and sound sciences into medical and engineering curricula across universities in the Arab world [26]. This integration will enhance students' abilities in critical thinking; creativity; communication; and cultural competency; preparing them for the demands of the 21st-century workforce.

4.2. Curriculum development

The development of interdisciplinary curricula will involve the creation of courses that blend technical training with the humanities. For example, medical programs could introduce courses in narrative medicine; where students learn to engage with patient stories; while engineering programs could include design thinking workshops that emphasize creativity and collaboration. These courses should be integrated into existing programs as core components rather than electives; ensuring that all students benefit from interdisciplinary learning.

4.3. Faculty training

Effective interdisciplinary education requires well-trained faculty capable of collaborating across disciplines. While faculty development programs are necessary; they come with financial and human resource demands. These initiatives will require investment in training and potentially recruiting or reallocating faculty with interdisciplinary expertise [27].

To mitigate budget constraints; universities can seek external funding from government grants or industry partnerships that value interdisciplinary approaches. Phased implementation of these programs can also help reduce costs by starting on a smaller scale before full expansion. Online training options can further lower expenses by providing accessible; flexible resources that minimize infrastructure needs.

Encouraging collaboration across departments is important; though it can be challenging for faculty used to traditional teaching methods. To overcome this; universities can create a more collaborative environment by offering recognition and support for joint research projects. Providing incentives for interdisciplinary work motivates faculty to engage in these efforts.

Regular workshops and meetings can also help by promoting open discussions and building a culture where collaboration becomes a natural part of academic life.

4.4. Pilot programs

Pilot programs should be introduced at select universities to test how well interdisciplinary education works [28]. These programs will combine technical and humanities courses and will be assessed using both qualitative and quantitative methods; including student feedback; academic results; and employment outcomes. If the pilot programs show positive results; they can be expanded to other universities in the region.

4.5. Student assessment and feedback

New assessment tools will be created to measure student outcomes in both technical and interdisciplinary skills [29]. These tools will include case studies; peer evaluations; and group projects that encourage students to use knowledge from different fields. Regular feedback from students will help track how well the courses are building skills like creativity; communication; and cultural awareness; as well as their ability to solve real-world problems using interdisciplinary knowledge.

In addition to grades, success will also be measured by how well students perform in group projects; case studies; and capstone experiences that require them to connect ideas across subjects. This approach ensures the assessments capture both technical skills and the broader abilities that interdisciplinary education aims to develop.

4.6. Community engagement

Getting involved with the community is a key part of interdisciplinary education; giving students real-world experience. Medical students might join public health projects; using narrative medicine to connect with different patient groups. Engineering students could work on urban planning projects; teaming up with local communities to create solutions that fit both cultural and environmental needs. These hands-on projects help students build practical skills and understand the social impact of their work.

Universities can partner with governments; NGOs; and local industries to support these projects. Regular evaluations will show how these projects benefit both students and the communities they serve; helping measure the success of interdisciplinary programs.

5. Measuring interdisciplinary success

5.1. Student learning outcomes

Interdisciplinary education helps students develop critical thinking; creativity; problem-solving; and communication. Progress is measured with tools like the Watson-Glaser and Torrance tests; and group projects show how students apply their knowledge.

Creativity is assessed through tests and project portfolios. Engineering students might create sustainable solutions, while medical students design public health campaigns. Feedback from peers and reviewers offers helpful insights.

Teamwork also improves through these projects. Peer reviews; project outcomes; and self-assessments track how well students collaborate. Success comes from combining ideas from different fields to solve real-world problems.

5.2. Career and employment outcomes

Graduates from interdisciplinary programs are often more ready for jobs that need flexibility and creativity. We can measure their success by looking at job placement rates. By comparing how many interdisciplinary graduates find jobs to those from traditional programs; universities can see if this training helps students. Higher placement rates suggest these programs are good at preparing students for work.

Employer feedback is also helpful. Surveys or interviews can show how well interdisciplinary graduates perform in jobs; especially in problem-solving; communication; teamwork; and leadership. Employers' views on how graduates handle tasks and work with others highlight the value of interdisciplinary education. This mix of job placement rates and employer feedback shows how well these programs prepare students for the workforce.

5.3. Student engagement and satisfaction

Student satisfaction is key to measuring the success of educational programs, including interdisciplinary education. Universities can use regular surveys to find out how engaged students are with this approach and whether it helps them reach their career goals. These surveys provide insight into how students feel about the program; especially regarding its ability to prepare them for real-world challenges that need interdisciplinary thinking. If students believe the program gives them the necessary skills for various jobs; it suggests the program is effective.

Participation rates are another important measure of success. If students find interdisciplinary courses valuable; enrollment in these programs is likely to increase. Higher participation rates show that students recognize the benefits of interdisciplinary learning and choose these courses over traditional options. This shift in interest highlights how effective interdisciplinary education is in preparing them for future job demands.

5.4. Academic performance and research output

The quality of work done by students in interdisciplinary programs is an important sign of success. When students mix knowledge from different fields in their capstone projects or theses; it shows they can connect various subjects. These projects reflect personal achievements and show how well the program promotes critical thinking and creativity. Reviewing this work gives universities helpful feedback on how effective their curriculum is.

Another important measure is research output and publication rates. For graduate students, the number of interdisciplinary research projects published in journals or presented at conferences shows the program's impact. Universities should also look at

how often faculty members work together on research across departments. These collaborations can lead to new findings and publications, highlighting the program's strengths. A strong output of interdisciplinary research enhances the school's reputation and shows that the program encourages curiosity and teamwork.

5.5. Institutional and faculty engagement

Faculty engagement is important for the success of interdisciplinary education programs. When faculty work together across departments in teaching and research; it helps students learn better. Co-teaching allows instructors to share different views, improving the learning experience. Collaboration on research projects also fosters teamwork and opens up new chances for innovation. Universities can measure success by counting how many collaborations and team-taught courses there are; showing how involved faculty are in interdisciplinary education.

Another important sign of success is the amount of grant funding for interdisciplinary research. This funding shows how much outside support there is for this work. When universities and faculty get grant funding; it means that groups like government agencies; businesses; or nonprofits see the value of interdisciplinary research in solving real-world problems. More funding helps support the university's approach to interdisciplinary education and provides resources to enhance research efforts.

5.6. Community and industry impact

The impact of interdisciplinary education on the community and industry is a keyway to measure success. When students work on community projects or with businesses; they use their skills to solve real problems. These experiences provide practical learning and help address social and industrial challenges. By looking at the results of these projects; universities can see how well their programs prepare students for real-world issues.

Community projects show the social value of interdisciplinary education. Universities should check how service-learning projects benefit both students and the communities they help. Metrics like the number of partnerships; project results; and feedback from community members help measure success. Projects that create positive change highlight the value of interdisciplinary education.

Working with industries connects interdisciplinary programs to the job market. The number and quality of these partnerships show how well interdisciplinary approaches are accepted in the real world. Positive feedback from industry partners about how well solutions work gives insight into the program's impact. These collaborations show how students' skills lead to innovative solutions and highlight the importance of interdisciplinary education in connecting schools with the workforce.

5.7. Balancing qualitative and quantitative metrics

Assessing interdisciplinary education can be challenging. Quantitative assessments like exams measure knowledge and problem-solving; but they may miss important aspects like creativity and how students connect ideas from different fields.

Qualitative assessments—such as portfolios; peer reviews; and reflections—help show how students think creatively and apply what they’ve learned in practical ways. These methods give insight into how well students are integrating different disciplines.

By using both types of assessments; educators get a fuller understanding of student progress. Capstone projects; for example; combine technical skills with creative problem-solving in real-world scenarios. Regular updates to these tools will help them stay effective and relevant to interdisciplinary education.

6. Conclusion

The integration of language arts and sound sciences into medical and engineering education in the Arab world presents a transformative opportunity to fundamentally improve how students approach problem-solving; creativity; and critical thinking. Traditionally, education in the region has followed more specialized paths; with medical and engineering disciplines focusing primarily on technical knowledge and isolated skill sets. However, by adopting successful interdisciplinary models from global institutions such as Columbia University’s narrative medicine; Aalborg University’s project-based learning approach; and Finland’s interdisciplinary education system; Arab universities can broaden the educational experience. These models encourage students to approach problems holistically; blending scientific rigor with creative and cultural insights; ultimately preparing them for the multifaceted challenges of the modern world [4].

Interdisciplinary education creates a lively learning environment where students think beyond traditional subjects. Adding language arts to technical fields helps improve communication; cultural awareness; and empathy; which are important today. For example, narrative medicine boosts empathy in healthcare and helps students connect with patients as individuals, which is vital in diverse cultures like the Arab world. In engineering, combining design thinking with the humanities can lead to new ideas in sustainable urban planning and renewable energy, both important for the region's future [30].

To measure success; universities can use various metrics. Student learning outcomes show how well they absorb and apply interdisciplinary knowledge. Evaluating capstone projects; theses; and collaborative research reveals how effectively students combine knowledge from different fields. Career and employment data highlight the benefits of interdisciplinary education. Graduates may be more adaptable; work better in diverse teams; and solve complex problems; making them attractive to employers. Tracking job placement rates and career growth compared to traditional programs shows clear evidence of success.

Community engagement and industry partnerships are also important indicators of the program’s impact. Service-learning projects; where students apply their knowledge to solve real issues in their communities; help measure how well the program prepares them to make a difference. Universities should assess the number of partnerships with local communities and industries; as well as the results of these projects; to determine the program's relevance. Positive feedback from community members and industry partners shows the effectiveness of interdisciplinary solutions.

Collaboration among faculty is another key measure of success. When faculty from different departments co-teach or work on research together; it enriches the student experience. This collaboration also drives innovation, leading to more grant funding for interdisciplinary projects. Increased research output and successful grant applications demonstrate the program's impact, showing that interdisciplinary education benefits both students and the academic community.

In summary, integrating language arts and sound sciences into medical and engineering education in the Arab world can enhance the academic experience and prepare students to promote innovation and positive social change. Interdisciplinary education encourages critical; creative; and empathetic thinking; helping students navigate modern society's complexities. By developing graduates who are skilled and culturally aware; Arab universities can prepare students to be leaders and contribute to their communities and the region [31].

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