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Review Article

Introducing inter-professional education in curricula of Saudi health science schools: An educational projection of Saudi Vision 2030



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المخلص

بدأت الحكومة السعودية مؤخراً، في وضع خطط لتحسين كل من نظام الرعاية الصحية والتعليم الصحي. ويتطلب توفير الرعاية المثلى في مؤسسات الرعاية الصحية تعاون وتفاعل مقدمي الرعاية الصحية من القطاعات المختلفة. وقد بينت الأبحاث المبينة على البراهين أن تحسين التفاعل والتواصل بين العاملين في الرعاية الصحية يؤدي إلى تحسين نتائج علاج المرضى والتقليل من الأخطاء الطبية. وقد تبين أن استخدام التعليم المتداخل بين التخصصات في برامج تدريب التخصصات الصحية في بعض الجامعات الغربية أداة فعالة لتحقيق تواصل وتفاعل أفضل بين مقدمي الرعاية الصحية. تتناول هذه الورقة إمكانية إدخال التعليم المتداخل بين التخصصات في تعليم التخصصات الصحية في المملكة العربية السعودية لدعم رؤية السعودية ٢٠٣٠.

الكلمات المفتاحية: التعليم المتداخل بين التخصصات؛ رؤية السعودية ٢٠٣٠؛ نظام الرعاية الصحية؛ الاتصال؛ تعليم التخصصات الصحية

Abstract

Recently, the Saudi government initiated plans to improve both the health care system and health profession education. Providing optimal care in health care institutions requires health care providers from different services to collaborate and interact. Evidence-based research has shown that optimizing the interactions and communication between health care workers improves patient outcomes and reduces medical errors. The use of interprofessional education (IPE) in undergraduate health profession programmes in some Western

universities has been found to be an effective tool for improving communication and interaction between health care providers. This paper addresses the possibility of introducing IPE into health profession education in KSA to support Saudi Vision 2030.

Keywords: Communications; Health care system; Health profession education; Interprofessional education; Saudi Vision 2030

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Saudi Vision 2030 and health care

Earlier in 2016, the Saudi government – headed by the Custodian of the Two Holy Mosques, King Salman Bin Abdulaziz – approved Saudi Vision 2030.¹ This vision represents an effort to improve all aspects of the Saudi population's wellbeing and development. The development of the health care system to provide optimal health care for Saudis is an essential element of Saudi Vision 2030.^{1–3} Achieving the 2030 goals related to the health care system requires collaboration and interaction between the Ministry of Health and other health care providers and among the public and private health science education providers in the country. This effort will align the skills of students graduating from health care schools and colleges with the needs of the country, as outlined in Saudi Vision 2030. Matching the educational curriculum of the health science education bodies to the actual needs of the health care system in the country will ensure the availability of future health care providers who are well-prepared to meet those

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needs. These future health care providers are the individuals who are expected to move the health care system forward to achieve the 2030 vision.

The importance of collaboration among health care providers to achieve better patient outcomes

Some reports have shown that medical errors are the third leading cause of death (trailing only heart disease and cancer).⁴ In health care institutions, such as hospitals, dispensaries, and polyclinics, the best patient care has been linked to attitudes regarding collaboration and teamwork among medical care providers.^{5–7} Additionally, several reports have shown that many medical errors – including some that have led to fatalities – were related to poor interactions or miscommunication among the medical care professionals who were treating those patients.^{5–7} In a study involving several large American medical institutions, better communication was found to reduce medical errors by 23% and the rate of preventable adverse events by 30%.⁵

In KSA, as in the rest of the world, both medical errors and medicolegal litigation are frequently reported.^{8–11} Those reports primarily show statistics for the involved subspecialties and patterns of errors.^{8–11} Although the role of poor communication is not addressed in those reports, previous quality evidence has emphasized the important role that miscommunication among health care providers has played in causing medical errors.^{12–15}

The evidence presented above highlights the need for health science education that produces health care workers who are good team players.¹⁴ This is one of the key rationales underpinning the concept of interprofessional education (IPE).

Definition and history of IPE

IPE is defined by the UK Centre for the Advancement of Interprofessional Education (CAIPE) as an occasion in which two or more professionals learn from and about one another to improve collaboration and the quality of care; the definition includes members of professions both before and after qualification.^{16–21} An alternative definition proposes that IPE is a teaching and learning process that fosters collaborative work between two or more professionals and improves the quality of care. The Canadian Interprofessional Health Collaborative (CIHC) adds that IPE occurs when health care professionals learn collaboratively within and across disciplines to acquire the knowledge, skills, and values required to work in teams.²² This concept is different from multi-professional education or shared and common learning.²³

Historical view of IPE

IPE was first initiated through sporadic efforts in North America and the UK in the 1960s, and the Journal of IPE was first published in 1986.⁵ In 1988, twenty years after its introduction, IPE was promoted by the WHO in two reports: Continuing Education Opportunities for Physicians and Learning Together to Work Together for Health.^{19,24,25} The WHO has continued to support IPE,

and in 2010, it published the Framework for Action on Interprofessional Education and Collaborative Practice.²⁶

Interprofessional education as a tool to improve the health care system

The importance of IPE stems from the need for health care team members who collaboratively and competently provide high-quality and safe patient care.^{26,27} Each member of a health care team must understand the roles of members from different professions and must use appropriate communication and conflict management skills.^{27,28} Furthermore, the aging population, the increasing number of chronic illnesses, the number of patients who are in need of complex care, and the rapid evolution of scientific knowledge all necessitate interprofessional collaboration to achieve optimal patient care.^{24,26,28}

Another important point is that IPE is an important accreditation standard or recommendation guideline for different health care profession education accreditation bodies and councils.^{20,22,24,29}

Supportive evidence for the effectiveness of IPE

Evidence of the effectiveness of IPE had been demonstrated at the learner, patient care, and organizational levels.^{30–33}

In comparison to traditional education, IPE was found to have a positive effect on enabling the acquisition of the knowledge and skills necessary for collaborative teamwork.^{19,30} In the health care context, IPE is effective in teaching students about the role of other health care professions and in changing students' attitude towards those professions.^{26,28,31–35} IPE increases job satisfaction, reduces tension and facilitates better conflict management.^{30,35}

IPE was found to be cost effective and cost saving by reducing the use of services and encouraging less redundancy in medical testing. IPE also had a positive impact on the appropriate use of health care resources, and it increased the use of preventive services.^{26,30}

IPE was also found to have positive impacts on patient care practices, patient and family satisfaction, patient safety and error rates.^{20,28,30,35,36}

Research has identified patient care areas in which IPE has a positive effect on outcomes and can be expected to benefit patients and the community in the long term.

Studies have shown that IPE has a positive effect on outcomes in the following patient care areas or types of patients: geriatrics and chronic illness (patients live longer), primary health care and community medicine, rural medicine, rehabilitation medicine, psychiatric medicine, community services for patients with learning disabilities, emergency medicine, domestic violence victims (with respect to care delivery), at-risk children, and HIV/AIDS and other infectious diseases, such as malaria.^{17,19,20,25,31} At the community level, IPE is expected to ease access to health services, encourage the appropriate use of health specialties and increase access to health care in rural areas and for underserved populations.^{26,30} Health crises are another critical area in which IPE may promote positive collaboration and teamwork practices.²⁶

Would IPE be of value in the Saudi Vision 2030?

None of the health science education institutions in KSA currently include efficient IPE programmes in their curricula as per its classical definition. This is also the case for other health science education bodies in the region. Unsurprisingly, studies on IPE in KSA and other countries in the region are very limited. The first report on IPE in the Arabian Gulf region was from the United Arab Emirates.²⁷ In that report, El-Zubeir ET al.²⁷ found that both medical and nursing students believed that IPE has beneficial academic and clinical effects. The second report on IPE in the region was our report from King Abdulaziz University; this study was also conducted with 4th-year nursing and medical students, interns and medical residents. In our report, 75% of participants agreed that IPE is important. In addition, most participants in our study suggested that IPE will be of value in facilitating better physician and nurse interactions and improvements in patient care and outcomes.²⁸ In another report conducted in Riyadh by Al-Eisa et al.²⁹ with students in the medical, nursing, pharmacy, physical therapy, occupational therapy, speech and hearing therapy, health education and nutrition specialties, a majority of the participants agreed or strongly agreed that IPE will improve both academic and clinical outcomes. As an initiative of The College of Pharmacy, Qatar University hosted the first Middle East conference on IPE on March 12, 2015. That conference covered different aspects of IPE, including student perceptions of the effectiveness of IPE, prospective plans for IPE in Middle Eastern countries, pilot studies of educational methods for IPE, and IPE assessment. Some of the topics covered the challenges that Middle Eastern countries can expect to face in implementing IPE.³⁰ On the other hand, some Saudi health science schools are offering IPE-based activities without involving students from other health science schools.³⁶ King Saud University has developed a strategic workshop for IPE teaching and learning at its Health Sciences College; however, that programme is yet not completely implemented.³⁷

Planning to introduce IPE in health science schools in KSA^{17,19,31–35}

Planning IPE programmes will require the collaboration of the Ministry of Education and the Ministry of Health to determine the actual needs relating to IPE and the types of health care provider interactions and teamwork that should be learned by undergraduate health science students.

Things that can facilitate IPE in the Saudi Vision 2030

To support these efforts, international IPE experts can be consulted or imported in the development of a broad, overall plan for IPE in KSA. This plan will include precisely where and when in the health science curricula IPE can be introduced, and appropriate IPE learning materials, teaching strategies and methods can then be determined based on the context of each health science school.^{31–35,38–40}

The introduction of IPE into the country will not succeed without the support of the government and the full

administrative support of each health science education body. The implementation of IPE in large universities and institutes that include different health science schools or colleges will require the support of the main governors of those universities and institutes. In addition to administrative support, financial support will be essential for the success of a new IPE programme. IPE budget allocation, both at the national level and locally at different health science schools, is an important driver of its success. Also important are the collaboration and interaction between health science teaching colleges at these institutions.

Health science school curricula tend to have similarities in core foundational courses, such as human anatomy and physiology. Moreover, at several Saudi universities, all undergraduate health science students have the same curriculum in the first year. IPE-based curricula can be included in the shared and similar educational activities in the foundation years. To make sure that the required IPE educational goals are met, IPE should be included as a requirement to obtain a degree in the health science profession. Student research activities can also bidirectionally promote IPE; for instance, IPE can be used to promote student research by teaching health science students how to work together in research activities via collaboration and smooth interaction. Moreover, medical education research on IPE in KSA can promote IPE development in the country.

Another good place for teaching IPE is via missionary or volunteer health-providing activities.²⁶ In such activities, students from different health science schools can be trained together on a team. Rapidly developing technology can also be used to facilitate IPE by creating student forums or groups from different health science schools. This will help students share ideas and interact easily with other health science students, including those from different universities.

IPE learning activities, such as workshops, simulation sessions or real-case scenarios, that include different health science students represent good educational tools for approximating real-life work situations.³⁸ Several Saudi universities have founded simulation centres for health science teaching. Some of these centres have been internationally recognized and accredited.^{41–44} The experience of these centres can be leveraged to build simulation-based^{17,19,31,32,40,45} IPE activities and workshops for undergraduate health science students.

Problem-based learning (PBL) as a method in IPE education

PBL has been found to be an excellent method in health science education. It promotes student interaction, motivates students to engage in active learning and maintains the faculty role as a moderator to direct students' scientific interaction. Applying PBL in IPE teaching is not expected to be an obstacle, as several health science schools in KSA are utilizing PBL as a method for educating health science students.^{46,47} Several Saudi health science schools and colleges have introduced PBL as a method of education in both basic and clinical science disciplines.^{48–50} Through the creation of well-planned PBL scenarios that involve interactions among multiple professions and discussions

moderated by educators from different health science schools. PBL is expected to provide a great opportunity for interactive student learning that mimics reality.

Post-IPE implementation assessment methods can be planned by educators who have participated in planning and teaching IPE. Students should be assessed to ensure that the intended teaching goals are appropriately met. Several assessment methods, such as case scenarios, simulated cases or standardized patients, can be used in the assessment of IPE.

Once IPE has been implemented in health science schools in KSA, IPE learning outcomes at the national level of health care must be measured. Moreover, the programme must be continually revised and evaluated to address any weaknesses, to identify areas for improvement and to ensure that it aligns with rapidly changing and developing health care needs.^{51–54}

*Expected challenges in the introduction and development of IPE*⁵⁵

The lack of IPE experts in KSA is a major challenge for the initiation of a national IPE programme by the Ministry of Education. Moreover, most undergraduate health science curricula are inflexible with respect to the content of their programmes. This may make it difficult to coordinate the inclusion and timing of IPE in curricula.

As IPE is a relatively new concept in the Arab Gulf region, faculty may lack the skills to teach an IPE-focused curriculum. Overcoming this challenge will require the introduction of faculty development programmes or workshops to raise awareness of IPE and to prepare faculty members to teach IPE.⁵²

Health care profession students may not have sufficient time to participate in IPE-based activities. This limitation can be overcome by including IPE as a core course with appropriate assessment methods and additional extracurricular activities. This approach will help ensure that the targeted learning outcomes are successfully achieved.⁵²

Conclusion

IPE has long been recognized in the Western world; however, it is a relatively new concept in KSA and other Middle Eastern countries. The implementation of IPE in Saudi health science schools is likely to improve communication and interaction between future health care workers. In addition, IPE is expected to have a positive effect on patient care and outcomes. IPE is also expected to promote the appropriate utilization of health care resources and reduce waste in the budget.

Conflict of interest

The author has no conflict of interest to declare.

Author's contributions

HIF is the sole author who created the idea of this review, revised the literature, wrote the initial draft, revised and edited the second draft. She proof read the article and approved the final draft. HIF is solely responsible for the content and the similarity index of this article.

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References

1. Saudi 2030 Vision. Available from: <http://vision2030.gov.sa/ar/node/9>. Last accessed August 2016.
2. Almalki M, Fitzgerald G, Clark M. Health care system in Saudi Arabia: an overview. *East Mediterr Health J* 2011; 17: 784–793.
3. National Transformation Program 2020. Page 30. Available from: http://vision2030.gov.sa/sites/default/files/NTP_En.pdf. Last accessed August 2016.
4. James JT. A new, evidence-based estimate of patient harms associated with hospital care. *J Patient Saf* 2013; 9: 122–128. <http://dx.doi.org/10.1097/PTS.0b013e3182948a69>.
5. Starmer AJ, Spector ND, Srivastava R, West DC, Rosenbluth G, Allen AD, et al. Changes in medical errors after implementation of a handoff program. *N Engl J Med* 2014; 371: 1803–1812. <http://dx.doi.org/10.1056/NEJMs1405556>.
6. Elder NC, Dovey SM. Classification of medical errors and preventable adverse events in primary care: a synthesis of the literature. *J Fam Pract* 2002; 51: 927–932.
7. Hickner J, Graham DG, Elder NC, Brandt E, Emsermann CB, Dovey S, Phillips R. Testing process errors and their harms and consequences reported from family medicine practices: a study of the American Academy of Family Physicians National Research Network. *Qual Saf Health Care* 2008; 17: 194–200. <http://dx.doi.org/10.1136/qshc.2006.021915>.
8. Henary BY, Al-Yahia OA, Al-Gabbany SA, Al-Kharaz SM. Epidemiology of medico-legal litigations and related medical errors in Central and Northern Saudi Arabia. A retrospective prevalence study. *Saudi Med J* 2012; 33: 768–775.
9. Alsaddique AA. Medical liability. The dilemma of litigations. *Saudi Med J* 2004; 25: 901–906.
10. Samarkandi A. Status of medical liability claims in Saudi Arabia. *Ann Saudi Med* 2006; 26: 87–91.
11. AlJarallah JS, AlRowaiss N. The pattern of medical errors and litigation against doctors in Saudi Arabia. *J Fam Comm Med* 2013; 20: 98–105. <http://dx.doi.org/10.4103/2230-8229.114771>.
12. La Pietra L, Calligaris L, Molendini L, Quattrin R, Brusaferrro S. Medical errors and clinical risk management: state of the art. *Acta Otorhinolaryngol Ital* 2005; 25: 339–346.
13. Chang A, Schyve PM, Croteau RJ, O'Leary DS, Loeb JM. The JCAHO patient safety event taxonomy: a standardized terminology and classification schema for near misses and adverse events. *Int J Qual Health Care* 2005; 17: 95–105. <http://dx.doi.org/10.1093/intqhc/mzi021>.
14. Higazee MZ. Types and levels of conflicts experienced by nurses in the hospital settings. *Health Sci J* 2015; 9: 7.
15. Taran S. An examination of the factors contributing to poor communication outside the physician-patient sphere. *McGill J Med* 2011; 13: 86.
16. Interprofessional Education Collaborative. *Team based competence building a shared foundation for education and clinical practice*. Washington DC: Robert Wood Johnson Foundation; 2011.
17. Oandasan I, Reeves S. Key elements for interprofessional education. part 1 the learner, the educator and the learning context. *J Interprofessional Educ* 2005; 1: s21–38.
18. Levison D. Council of heads of medical schools and dean of UK faculty's position paper. *Interprofessional Educ* Feb 2003.

- Available at <http://www.medschools.ac.uk/AboutUs/Projects/Documents/Interprofessional%20Education.pdf>. Last accessed August 2016.
19. Hammick M, Freeth D, Koppel I, Reeves S, Barr H. A best evidence systematic review of interprofessional education: BEME Guide no. 9. *Med Teach* 2007; 29: 735–755. <http://dx.doi.org/10.1080/01421590701682576>.
 20. Buring SM, Bhushan A, Broeseker A, Conway S, Duncan-Hewitt W, Hansen L, et al. Interprofessional education: definitions, student competencies, and guidelines for implementation. *Am J Pharm Educ* 2009; 73: 59. <http://dx.doi.org/10.5688/aj730459>.
 21. Olenick M, Allen LR, Smego Jr RA. Interprofessional education: a concept analysis. *Adv Med Educ Pract* 2010; 1: 75–84. <http://dx.doi.org/10.2147/AMEP.S13207>.
 22. Canadian Interprofessional Health Collaborative (CIHC). Available from: <http://www.cihc.ca/>. Last accessed March 2014.
 23. Clifton M, Dale C, Bradshaw C. *The impact and effectiveness of interprofessional education in primary care. An RCN literature review*. Royal Coll Nurses; 2007. pp. 1–28.
 24. Thistlethwaite J. Interprofessional education: a review of context, learning and the research agenda. *Med Educ* 2012; 46: 58–70. <http://dx.doi.org/10.1111/j.1365-2923.2011.04143.x>.
 25. Barr H. Interprofessional education. Chapter 24. Educational strategies. Available from: http://www.nvmo.nl/resources/js/tinyMCE/plugins/imagemanager/files/20120926_HFDS24boekXX-2002_Barr-H_Interprofessional_Education.pdf#page=29. Last accessed March 2014.
 26. WHO. *Framework for action on interprofessional education & collaborative practice*. WHO; 2010. Available from: http://whqlibdoc.who.int/hq/2010/WHO_HRH_HPN_10.3_eng.pdf. Last accessed March 2014.
 27. El-Zubeir M, Rizk DE, Al-Khalil RK. Are senior UAE medical and nursing students ready for interprofessional learning? Validating the RIPL scale in a middle eastern context. *J Interprof Care* 2006; 20: 619–632. <http://dx.doi.org/10.1080/13561820600895952>.
 28. Fallatah HI, Jabbar R, Fallatah HK. interprofessional education as a need: the perception of medical, nursing students and graduates of medical college at King Abdulaziz University. *Creat Educ* 2015; 6: 248–254. <http://dx.doi.org/10.4236/ce.2015.62023>.
 29. Al-Eisa E, Alderaa A, AlSayyad A, AlHosawi F, AlAmoudi S, AlTaib S, et al. The perceptions and readiness toward interprofessional education among female undergraduate health-care students at King Saud University. *J Phys Ther Sci* 2016; 28: 1142–1146. <http://dx.doi.org/10.1589/jpts.28.1142>.
 30. *First middle Eastern conference on interprofessional education*. Doha, Qatar, 4–6 December 2015. Available from: <http://innohealthed.com/index.php/ighpe/article/view/34>. Last accessed August 2016.
 31. Nicol P. *Interprofessional education for health professionals in Western Australia: perspectives and activity*. Sydney: University of Technology; 2013. Available from: http://www.health.wa.gov.au/wactn/docs/IPE_for_Health_Professionals_in_WA.PDF. Last accessed March 2014.
 32. Bridges DR, Davidson RA, Odegard PS, Maki IV, Tomkowiak J. Interprofessional collaboration: three best practice models of interprofessional education. *Med Educ Online* 2011; 16: 6035. <http://dx.doi.org/10.3402/meo.v16i0.6035>.
 33. Frenk J, Chen L, Bhutta ZA, Cohen J, Crisp N, Evans T, et al. Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. *Lancet* 2010; 376: 1923–1958. [http://dx.doi.org/10.1016/S0140-6736\(10\)61854-5](http://dx.doi.org/10.1016/S0140-6736(10)61854-5).
 34. Hammick M. Interprofessional education: evidence from the past to guide the future. *Med Teach* 2000; 22: 461–467. <http://dx.doi.org/10.1080/01421590050110713>.
 35. Ho K, Jarvis-Selinger S, Borduas F, Frank B, Hall P, Handfield-Jones R, et al. Making interprofessional education work: the strategic roles of the academy. *Acad Med* 2008; 83: 934–940.
 36. 5th-year curriculum of pharmacy King Abdulaziz University. Available at <http://pharmacy.kau.edu.sa/Content.aspx?SiteID=166&lng=En&cid=101498>. Last accessed October 2016.
 37. Strategic Workshop for Teaching and Learning Center Health Sciences Colleges King Saud University Wrap-Up. Available at <http://tlap.ksu.edu.sa/sites/tlap.ksu.edu.sa/files/attach/pub1.pdf>. Last accessed October 2016.
 38. Farra A, Zeenny R, Milane A, Al Asmar N, Zeeni N, Hoffart N, et al. *Poster 16. Designing an interprofessional educational curriculum for health and social care students: the LAU IPE Steps. First Middle Eastern Conference on Interprofessional Education*. Qatar, Doha. Page 10. Available from: <http://innohealthed.com/index.php/ighpe/article/view/34/52>. Last accessed August 2016.
 39. Kennedy D. *Poster 32. Narrative pedagogy for interprofessional education. First Middle Eastern Conference on Interprofessional Education*. Qatar, Doha. Page 19. Available from: <http://innohealthed.com/index.php/ighpe/article/view/34/52>. Last accessed August 2016.
 40. Reid J, Davies J. *Poster 11. The development of a simulation program for allied health professionals to support interprofessional education. First Middle Eastern Conference on Interprofessional Education*. Qatar, Doha. Page 8. Available from: <http://innohealthed.com/index.php/ighpe/article/view/34/52>. Last accessed August 2016.
 41. King Saud Bin Abdulaziz University for health sciences simulation center. Available at <http://www.ksau-hs.edu.sa/english/visitors/documents/clinicalskillsimulationcenterforimsh2014v2.pdf>. Last accessed October 2016.
 42. Medical simulation centre at KFMC as leading innovator in Saudi Arabia. Available at <https://vimeo.com/165308764>. Last accessed, October 2016.
 43. Clinical Skills and Simulation Center at King Saud University. Available at <http://news.ksu.edu.sa/en/node/102839>. Last accessed October 2016.
 44. Clinical Skills & Simulation Center (CSSC) at King Abdulaziz University. Available at <http://csc.kau.edu.sa/Default.aspx?SiteID=140073&Lng=EN>. Last accessed October 2016.
 45. Myriam BJ, Abi Hayla. *Poster 14. The development of an interprofessional education workshop for students from up to four professions. First Middle Eastern Conference on Interprofessional Education*. Qatar, Doha. Page 9. Available from: <http://innohealthed.com/index.php/ighpe/article/view/34/52>. Last accessed August 2016.
 46. Gwee MC. Problem-based learning: a strategic learning system design for the education of healthcare professionals in the 21st century. *Kaohsiung J Med Sci* 2009 May; 25(5): 231–239.
 47. Gwee MC. Globalization of problem-based learning (PBL): cross-cultural implications. *Kaohsiung J Med Sci* 2008 Mar; 24(3 Suppl): S14–S22.
 48. PBL at KAU faculty of medicine. Available at <http://medicine.kau.edu.sa/search.aspx?SiteID=0&lng=EN&qr=pbl>. Last accessed October 2016.
 49. King Saud bin Abdulaziz University for health sciences PBL. Available at <http://www.ksau-hs.edu.sa/English/Pages/Results.aspx?k=pbl&s=English>. Last accessed October 2016.
 50. King Saud University http://search.ksu.edu.sa/ar/search?advanced=true&sk-collection=default_collection&client=default_frontend&output=xml_no_dtd&proxystylesheet=default_frontend&getfields=*&filter=0&num=10&proxyreload=1&wc=200&wc_mc=1&oe=UTF-8&ie=UTF-8&ud=1&exclude_apps=1&sk-allwords=pbl&op=%D8%A7%D8%A8%D8%AD%D8%AB.

51. Johnson B, Lepine B, Hayla MA. *Poster 15. The development of a rubric to evaluate IPE competencies in game and scenario activities. First Middle Eastern Conference on Interprofessional Education*. Qatar, Doha. Page 10. Available from: <http://innohealthed.com/index.php/ighpe/article/view/34/52>. Last accessed August 2016.
52. Blue AV, Mitcham M, Smith T, Raymond J, Greenberg R. Changing the future of health professions: embedding interprofessional education within an academic health center. *Acad Med* **2010**; 85: 1290–1295. <http://dx.doi.org/10.1097/ACM.0b013e3181e53e07>.
53. Thistlethwaite J, Moran M, World Health Organization Study Group on Interprofessional Education and Collaborative Practice. Learning outcomes for interprofessional education (IPE): literature review and synthesis. *J Interprof Care* **2010**; 24: 503–513. <http://dx.doi.org/10.3109/13561820.2010.483366>.
54. Remington TL, Foulk MA, Williams BC. Evaluation of evidence for interprofessional education. *Am J Pharm Educ* **2006**; 70: 66.
55. Symes C, Wolsey C. *Poster 33. Challenges to implementing interprofessional education with nurses: a review of the literature. First Middle Eastern Conference on Interprofessional Education*. Qatar, Doha. Page 20. Available from: <http://innohealthed.com/index.php/ighpe/article/view/34/52>. Last accessed August 2016.

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