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# Evaluating an interprofessional education curriculum: A theory-informed approach

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## Abstract

**Background:** This paper retrospectively reports on an evaluation framework applied to a local interprofessional education (IPE) curriculum design. The theoretically informed IPE curriculum spans the undergraduate health and social care programmes of over 10 professions as a curriculum theme. The teaching design and its impact were informed by psycho-social and learning theories.

**Aims:** This meta-analysis is presented to share the importance of longitudinal IPE, whole curriculum evaluation for comparisons and to advance our understandings of what works and why.

**Method:** The meta-analysis used the Presage, Process and Product conceptual framework outlined by Biggs in 1993, and the Kirkpatrick in 1996, evaluation outcome model. Data are shared on the final overall learning from evaluating the teaching and the outcomes from students, teachers, practitioners, patients and carers.

**Results:** The evaluation highlighted cyclical issues relating to students experiences, facilitators abilities and highlights the challenges of learning in practice which was highly praised by students. The problems and challenges were solved through the application of theory to illuminate our understandings.

**Conclusion:** We lament at missed opportunities for the application of theoretically informed research questions that still require to be addressed. However, we share this framework as having offered a complete and comprehensive evaluation process.

## Introduction

Few interprofessional education (IPE) curricula<sup>1</sup> for integration within core profession-specific programmes have been fully described and those that have, vary because of the need to accommodate local arrangements within participating health and social care programmes (Barratt et al. 2003; O'Halloran et al. 2006; Barr 2007; Curran et al. 2010). Despite this, there is strong agreement about the goal of preparing students for future collaborate practice (Freeth et al. 2005; Gilbert 2005), the intended learning outcomes needing to align to health and social care policy and professional body requirements (Thistlethwaite & Moran 2010; World Health Organisation 2010; Thistlethwaite 2012) and for early theoretical understandings to be applied later within practice learning (Thistlethwaite & Nisbet 2007). However, there is limited understanding on what works well and what to avoid, partly because of the relative lack of discussion between IPE curriculum developers of the theoretical or conceptual frameworks underpinning the rationale, structure and evaluation of curriculum design (Reeves et al. 2011; Reeves & Hean 2013).

One of the challenges for IPE research is to articulate theoretically informed evaluation models which can begin to clarify the constituent events and interactive processes that lead to new knowledge and understandings (Frye & Hemmer 2012). The term evaluation is used here to

## Practice points

- Underpin curriculum evaluation of interprofessional education with a theoretical approach.
- Assess IPE curriculum as a whole not as segmented learning pieces to advance understandings of what works and why.
- Apply the concept of Biggs (1993), presage, process and outputs model to consider curriculum issues.
- Involve all stakeholders in any curriculum evaluation, students, faculty and patients.
- Take an open and reflective approach to theory choices when making education and evaluation decisions.

refer to well designed, valid and planned educational research rather than a post-learning measure used solely for educational quality purposes (De Bere 2010). Generally, reported IPE evaluations are of individual initiatives, which form part of a curriculum, rather than evaluations of an entire curriculum. This partial means approach a fails to consider the entire programme which would present a better understanding of how to constructively align IPE within core profession-specific curriculum at both pre- and post-registration level

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(Biggs 1993). A curriculum with misguided non-aligned learning elements, be these entire modules/units/placements or small events within modules/units/placements, may fulfill their intended learning outcomes and be enjoyed by students, but fail to build and affirm an advancement towards the goals of IPE. We would argue that curriculum development requires an understanding of the whole learning journey to illuminate student engagement, highlighting IP events which progress learning and those with the least impact, while suggesting changes and identifying possible gaps. Lack of clarity on how learning helps to achieve curriculum goals is not unique to IPE; for example, medical education continues to debate “best evidence” for its curriculum and as such seeks constant affirmation of how to proceed (Harden & Lilley 2000; Wolf 2000; Regehr 2004; Hammick 2005), while seeking out conceptual frameworks to address complex problems and to develop possible solutions (Bordage 2009).

The curriculum evaluation reported here was jointly established by three Higher Education Institutions (HEIs) with different histories, each educating different health and social care professionals. One university has a medical school with social work and operating department practitioner (ODP) programmes, another programmes in pharmacy, speech and language therapy, social work, audiology, nursing (all branches) and midwifery, and the third, paramedics, occupational therapists and nursing education. Curriculum design was theoretically informed, combining knowledge of theories on social behaviour in groups from psychology and sociology and ideas about applied learning (Anderson et al. 2014).

Within the complexity of IPE curriculum where much is happening reflecting the multi-dimensionality so often found in social sciences and generating knowledge depends upon understanding the qualitative nature of human relationships, at least as much as on the application of quantifiable measures of learning gain and consolidation (Wong et al. 2012). For this reason we used an evaluation model that would enable recognition of how the new learning was received by students, faculty and practice. We recognised that change would result from the dynamic interplay of factors relating to each learning moment along the curriculum journey. Evaluation models we could have used include the “CIPP (context/input/process/product)” model (Frye & Hemmer, 2012, p. 296), and Coles and Grant’s model which sees effective curriculum as three components which must align: the curriculum as agreed on paper, as realised in-action and experienced by the students (Coles & Grant 1985).

Our choice was the Biggs’ 3 P Model, which enables consideration of the presage, process and product or outputs of student learning, the teachers journey in planning delivering and assessing outcomes and the patient story of engagement in the learning (Biggs 1993), and has been used elsewhere (Freeth et al. 2005; Reeves & Freeth 2006). The 3P model “represents an integrated system” (Biggs 1989, 2002), positing that the eventual outcomes of student learning depends on the interaction between the “presage” factors (student characteristics, teaching context and preparation) and “process” factors (student orientation to/engagement with learning, teaching style and pedagogic content). The model’s theoretical stance derives from complexity theory used previously to explore IPE

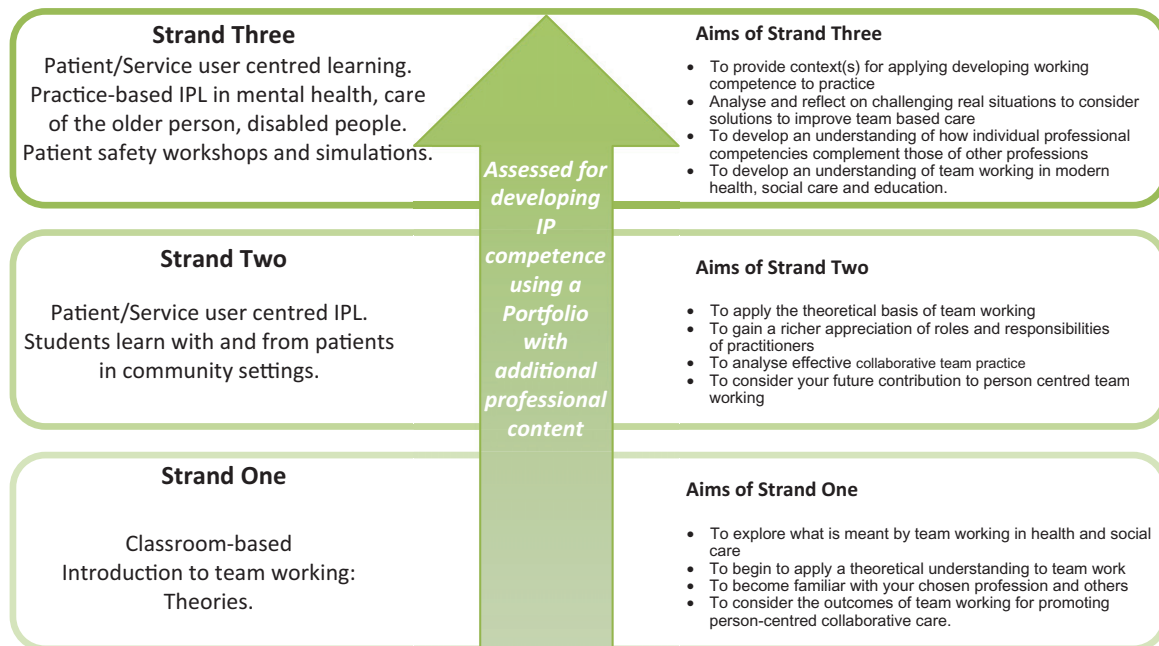
because of the additional layers of stakeholder views across different professional curriculum (Barr 2013). In addition, we applied the Kirkpatrick typology of education outcomes which have been modified for IPE, mindful not to be constrained by only these levels so that we would consider all the consequences of the learning on all participants including the unanticipated (Kirkpatrick 1996; Barr et al. 2005; Yardley & Dornan 2012).

This paper outlines meta-analysis of our IPE evaluation made in order to retrospectively reflect and identify the key messages about what had progressed interprofessional learning (IPL) in one locality. In doing so we aim to encourage theoretically informed evaluation approaches to develop clarity about improving IPE curriculum. With hindsight we might have done things differently, asking more theoretically informed questions for rigorous testing because we failed to appreciate the complexity of the undertaking (Frye & Hemmer 2012). In this we are not alone as authors continually request conceptual frameworks to help illuminate best practice (Bordage 2009). To this end, increasingly sophisticated frameworks for evaluation are being developed (Frye & Hemmer 2012).

## Our interprofessional curriculum

Policy in the UK (DOH 2000) propelled the establishment of a local group to develop our IPE strategy; a theoretical stance to support concrete developments in teaching and learning was drawn from psychology; in particular, utilising the contact hypothesis (Allport 1954), with attention to its adaptations for learning conditions within IPE to challenge traditional stereotypes (Carpenter 1995; Carpenter & Hewstone 1996). The design of individual learning events was influenced by educational theories relating to the process of learning as adhered to by cognitive constructivists, such as Piaget (1973), extolling a staged process of knowledge construction. Additionally, the process of social learning was considered, with learning communities in practice supporting medical curriculum primed for later IPE arrangements (Wenger 1998; Anderson et al. 2003). Social constructivist theorists, such as Bandura (1977), who place emphasis on constructing meaning through learning with others in a social context were utilised. The curriculum was designed to encompass introductory teacher-led learning, moved on to incorporate models of adult learning utilising self-directed learning processes for both personal and group reflection (Knowles 1978). We used learning triggers for self-directed problem-based reflective learning which were socially mediated through small-group study sessions allowing expansive (“deep”) learning to emerge (Schön 1983; Engeström 1987; Briggs & Myers 1995; Regehr 2004; Bleakley 2006).

The separate HEIs, bound by different curriculum commitments, and different professional programmes overseen by respective professional bodies, agreed a curriculum framework entitled the “Three Strand Model”, of IPL (Smith & Anderson 2007; Anderson et al. 2014). This assured that IPL was woven within existing modules within each respective school and it had a place in the curriculum; first, second and third year; varied when programmes ran beyond three years, but always reflected the beginning, middle and end periods of



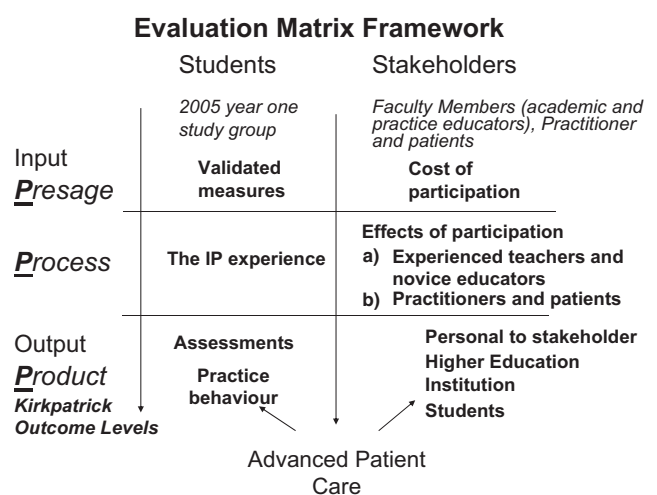
**Figure 1.** The framework for the curriculum.

study. IPL events were designed to be integrated into the programme framework; and ran for one, two or up to four days. The final IPE curriculum progressed from early conceptualisations of what it means to be interprofessional, delivered in classroom settings (strand one, one day) followed by practice learning with patients/service users (strand two, two-days) and further opportunities to work in practice with additional workshops and simulations (strand three, one lasting four days with others lasting one day and where students attend more than one event) (Figure 1).

A competence measure was used to assess student IPL because of its familiarity to the majority of local health and social care curriculum developers. In this way learning outcomes were established for assessing the development of knowledge, skills, attitudes and behaviours. All disciplines agreed that students should complete an Interprofessional Personal Portfolio to collate their reflections on their learning journey towards interprofessional competence. Students were given theoretical models to guide their reflections submitted as short essays after each IPL event. The reflections have now been analysed and revealed how the learning triggered new knowledge and skills and framed future intended behaviours (Domac et al. 2015). In addition, the portfolio contained profession-specific assessments to map against their various professional bodies' requirements for team working and collaborative practice.

### The evaluation strategy

We employed a regional evaluator, funded by the local health authority, from the outset, seeing this as integral to the development and sustainability of the local IPE curriculum, through prospective accounts of implementation and impact. The evaluation programme was supported by a regional research committee with representatives from each University, funders and drawing on recognised external expertise. Ethical



**Figure 2.** Evaluation matrix framework.

permission for the curriculum evaluation was obtained from the outset in 2005 (COREC; 05/Q2502/104).

Our evaluation model (Figure 2) considered the “assumptions of linear relationships between program elements and desired outcomes” (Frye & Hemmer 2012), while paying particular attention to the complexity of the views of all stakeholders, students and educators, service and patients, to help us to perceive how students advanced their knowledge, skills and attitudes and the impact of IPL. Each individual learning programme was evaluated against the Kirkpatrick outcomes levels (Table 1) (Kirkpatrick 1996).

The evaluation methodologies included mixed methods and cyclical data collection in prospective action-based qualitative studies (Table 2). We used conventional “output/outcome” evaluative methods, together with those which seek to look inside the “black box” (Carpenter & Dickinson 2008) in order to gain a better sense of the processes of joint learning

**Table 1.** Kirkpatrick levels to assess the learning impact of the IPE in the three strand model.

Kirkpatrick level		Data collection techniques
Level 1	Learners' reactions	Focus group discussions Free text comments in questionnaires
Level 2a	Modification in attitudes and perception	Focus group discussions Free text comments in questionnaires Scaling Measures: Likert Scales, RIPLS
Level 2b	Knowledge and skills	Pre- and post-questionnaires Portfolio Assessment Exam questions (short answer) Reflective case studies Critiques of Practice
Level 3	Changes in behaviour	Practice tutors feedback in portfolio Student statement of intent
Level 4a	Changes in organisational practice	Students feedback forms to practitioners Student presentations Interviews with practitioners
Level 4b	Service benefits to users and carers	Student focus groups Service users involvement in teaching Case study evidence Student feedback to practitioners Interviews with practitioners

and their implications for co-production of knowledge. Each element of the overall IPE programme was extensively evaluated to ensure the continuous appropriateness and continuity of learning. Different methodologies were implemented at different phases of the curriculum evaluation.

Despite a clear rationale for designing our teaching based on theories of learning and a clear theoretical rationale for the evaluation, we did not test theory in its application. In other words, we failed to address some key questions, for example, how would different teaching methods advance learning towards understanding interprofessional working? What are the most effective programmes and why? How does contact make learning different? Why and how does IPE advance learning? What are the cost implications of this new curriculum theme? What are the impacts upon each school and HEI? Our mistake was unrelated to methodological choices, as these were wide ranging to gather quantitative and qualitative data, but rather in our focus on the overall programme aims. Thus, our insights emerged iteratively by applying a theoretical approach in-action.

### The outcomes from the evaluation

Re-examining the evaluations highlighted what students were learning, why some teaching approaches were better received than others and various issues from the experiences of all stakeholders. Below we set out how, by applying theoretical insights, albeit retrospectively, we made sense of what was happening.

Considering first the “presage factors” we looked to see what issues constrained or successfully progressed the IPE curriculum. Evaluation using the RIPLS questionnaire to assess student readiness for IPL failed to reveal any substantive differences between the students prior to embarking on IPE for the first time (Table 3, Exemplar 1) (Parsell & Bligh 1999). Following the early strand, one learning practical concerns were raised, such as the teaching environment being often marginalised as IPE competed with established schedules,

which received the best teaching rooms, teaching support and shared payment for teaching resources.

Of *the process factors*, the approaches to teaching for learning in early strand one proved most challenging and a number of issues required theoretical consideration. These difficulties related to the development of professional identity which was largely uninformed when the students first met and as they struggled to profess strong associations to professions they knew little about. These tensions ran alongside the completion of the learning activities. Stereotyping and emotional reactions permeated their evaluations and reflective writing, similar to those found in other programmes (Table 3, Exemplar 1) (Hean et al. 2006). The formation of “in-groups” and “out-groups” as described by social identity theory (Tajfel & Turner, 1986) and the social gain from joining professional groups as explained by social capital theory were key to helping us to explore these findings (Bourdieu 1997). To address these problems teaching content changed to engage students in reflective exercises to unpack some basic understandings of team working in health and social care using theoretical tools to explore student emotions and attitudes. For example, exploring what is meant by emotional intelligence and why we naturally form stereotypes (Goleman 1998; Druskat & Wolff 2001).

We identified the need for deeper and richer appreciation of how to manage small group IPE facilitation. This led to the design and delivery of a new faculty development opportunity (Table 3, Exemplar 2). This explored psychological and sociological theories applied to human behaviours in groups, the sensitivities of interprofessional groups and the management of group dynamics. This theoretical framework helped to explain how some of the early IPE faculty sceptics changed their negative attitudes towards IPE to favour and value the aspirations of this learning. Our evaluations identified that the sceptics re-evaluated their attitude construction, explained by cognitive dissonance theory (Table 3, Exemplar 3) (Festinger 1957). The sceptic teachers were surrounded by positive role model teachers and students who were clearly enjoying the

**Table 2.** Evaluation methodologies.

Data collection tools	Description	Rationale
Validated questionnaires	Readiness for Interprofessional Learning (RIPLEs) questionnaire (Parsell & Bligh 1999)	To form a baseline for regular assessment of change
Questionnaire surveys	Weighted Likert scales	To assess student pre- and post-attitudinal change and knowledge gain. Scored questions were balanced with opportunities to express opinion in a narrative content
Postal questionnaires	Simple open questions	To patient/service users/carers and agencies provided an alternative opportunity for anonymous feedback and to reach a wider number and range of stakeholders
Follow up questionnaires	Using electronic surveys (SurveyMonkey®)	To exiting students at graduation and contactable alumni: Our greatest success has been from medical alumni, mainly because they have a longer period of training, and are more accessible for this purpose
Student focus group	Prompt questions led by the independent research evaluator	To enable students to consider the breadth of an experience
Stakeholder focus group	Prompt questions led by the independent research evaluator	To gain insights into the impacts and benefits of, for example, a practitioner team supporting IPE alongside their day-to-day practice
One-to-one interviews	Semi-structured	Faculty staff and other external stakeholders and with patients/service users
Student recommendations (learning outputs) for improving practice from practice-based IPE	Student feedback recommendations forms on their patient (case studies). These included quality improvements for patient care and service design	To assess the impact of the student learning for improving service delivery including feedback and suggestions to the professional teams on how to improve patient care

IPE and as a result came to change their cognition to favour and value this form of teaching. Clearly, the first steps in curriculum design required detailed understanding of theories of group behaviour. Further, despite initial concerns the value of early classroom learning was subsequently highlighted against the evaluations across the whole curriculum, as the later findings identified students' readiness to engage in IPL events in practice because of this early learning (Table 3, Exemplar 4).

In addition, explanation of other poor strand one evaluations are related to the alignment of the new IPE learning theme within the corpus of the main professional curriculum and integration of students' prior experiences. It became clear, and educators confirmed this finding, that the new learning was not always explained and integrated with profession-specific curricula, and students were heard saying "*why am I here?*" (Biggs 2002).

The most positive evaluations were for experiential learning in clinical teams with direct patient/service user involvement, based on a modified Kolb learning cycle which enabled constructivist learning through experience, reflection and analysis (Table 3, Exemplar 5). The Strand Two "*Health in the Community*" course was modified to accommodate the widening access of different student professions. Patient selection had to move on to those where the interplay of health and social care was evident and involved a broader range of professions including the voluntary sector. Reaching these understandings of practice-learning required many cycles of evaluations and this empirical research was invaluable (Table 3, Exemplar 4). Our practice-based learning in Strand Three has been adapted for community and hospital teaching; for example, in stroke and rehabilitation wards and

in community mental health units. During these developments action learning approaches engaged all stakeholders in assessing the impact of the teaching experience on student learning and building on these insights (Table 3, Exemplar 6). In particular, we have spent time listening to patients/service users and have been able to engage them within the teaching team (Table 3, Exemplar 7). This enabled us to grow practice-based communities of learning between participating professions, patients/service users and carers, learning facilitators and academics (Wenger 1998). These have ensured sustainability of this work, with community organisations now employing community IPE tutors.

Of the *product factors*, the outcomes of the evaluation were mapped against the *Kirkpatrick framework* and wider consequences were collated. Pre- and post-test questionnaire scores identified student learning (Kirkpatrick level 2b) and the additional free text comments have confirmed student reactions (Kirkpatrick level 1) and intentions for future behaviour (working towards Kirkpatrick level 3). Portfolio assessments offered insights into the students' subjective experience of IPE and their competence development. In-depth interviews and focus groups with students and educators were invaluable. Surveys, for example, demonstrate high levels of satisfaction and knowledge gain; on the other hand, this was balanced by more nuanced evidence provided through focus groups and interviews with students, patients and other stakeholders. The results prompted us to revise our teaching inputs and approach where certain disciplines had identified concerns, such as feeling marginalised: "*I got there and the doctor or nurse in charge, she was always talking to the two medical colleagues*" (Table 3, Exemplar 8, p. 236). This aspect of our evaluative work enabled us to identify differences of

**Table 3.** Research findings exemplars.

Exemplars	Paper details
1	Anderson ES, Thorpe LN. 2008. Early interprofessional interactions: Does student age matter? <i>J Interprof Care</i> 22(3):1–19
2	Anderson ES, Cox D, Thorpe LN. 2009. Preparation for educators involved in interprofessional education. <i>J Interprof Care</i> 23(1):81–94
3	Anderson ES, Thorpe LN, Hammick M. 2011. Interprofessional staff development: Changing attitudes and winning hearts and minds. <i>J Interprof Care</i> 25:11–17
4	Anderson ES, Lennox A. 2009. The Leicester model of interprofessional education: Developing, delivering and learning from student voices for 10 years. <i>J Interprof Care</i> 23(6):557–573
5	Lennox A, Anderson ES. 2007. The Leicester model of interprofessional education. A practical guide for implementation in health and social care. Higher Education Academy, subject centre Medicine, Dentistry and Veterinary Medicine. Special Report 9. ISBN 978-1-905788-45-3. [Accessed 13 May 2015] Available from <a href="http://78.158.56.101/archive/MEDEV/static/uploads/resources/SR9_Leicester_Model.pdf">http://78.158.56.101/archive/MEDEV/static/uploads/resources/SR9_Leicester_Model.pdf</a>
6	Kinnair D, Anderson ES, Thorpe LN. 2012. Development of interprofessional education in mental health practice: Adapting the Leicester model. <i>J Interprof Care</i> 26:189–197
7	Anderson ES, Ford J. 2012. Enabling service users to lead interprofessional workshops to improve student listening skills. Higher education mini grant, subject centre, medicine, dentistry and veterinary medicine. Project No: MP220. Newcastle. Available from <a href="http://www.medev.ac.uk/funding/7/22/funded/">http://www.medev.ac.uk/funding/7/22/funded/</a>
8	Anderson ES, Smith R. 2010. Learning from Lives together: Lessons from a joint learning experience for medical and social work students. <i>Health Soc Care Commun</i> 18(3):229–240
9	Anderson ES, Ford J, Thorpe LN. 2011. Learning to listen: Improving student's communication with disabled people. <i>Med Teach</i> 32:1–9
10	Anderson ES, Thorpe LN, Heney D, Petersen S. 2009. Medical students benefit from learning about patient safety in an interprofessional team. <i>Med Educ</i> 43:542–552
11	Anderson ES, Thorpe LN. 2010. Learning together in practice: An interprofessional education programme to appreciate teamwork. <i>Clin Teach</i> 7:19–25
12	Anderson ES, Thorpe LN. 2014. Students improve patient care and prepare for professional practice: An interprofessional community-based study. <i>Med Teach</i> 36:495–504
13	Domac S, Anderson ES, O'Reilly M, Smith R. 2015. Assessing interprofessional competence using a prospective reflective portfolio. <i>J Interprof Care</i> 29(3):179–187
14	Anderson ES, Thorpe LN. 2010. Interprofessional educator ambassadors: An empirical study of motivation and added value. <i>e-Med Teach</i> 32:e492–e500
15	Lennox A, Anderson ES. 2012. Delivering quality improvements in patient care: The application of the Leicester model or interprofessional education. <i>Qual Prim Care</i> 20(3):219–226

perception and the challenge of dealing constructively with problems arising from preconceptions and stereotypes. For example, “*I do think this course gave a very good chance to see how social workers do and what I can as a future clinician expect them to help me with as we work in a team, which I think was a very good experience*” (Table 3, Exemplar 8, p. 236).

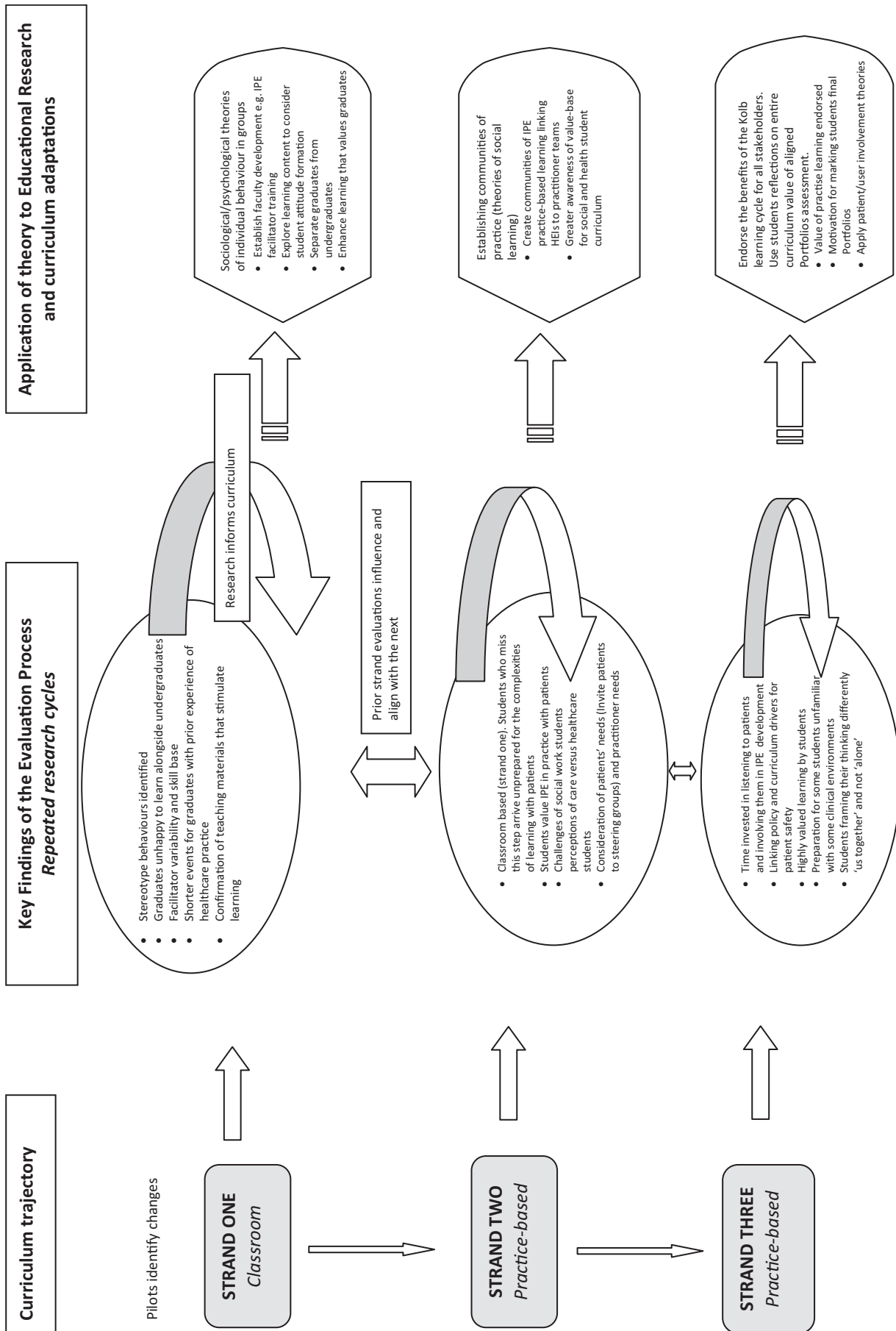
Of particular value and very positively received was the opportunity to engage students in shaping and designing learning (Table 3, Exemplar 9). Discovering how students frame their thinking came from comparative studies using uni- and interprofessional groups (Table 3, Exemplar 10). Student practice-based work on patient analysis showed how the interprofessional student teams had an impact on patient care and organisational practice. The outcomes of this learning reached the highest level of the Kirkpatrick framework, affirmed in feedback from practitioners and patients (Table 3, Exemplars 11, 12). Here we learnt that towards the end of their programmes interprofessional student teams can take on modified clinical responsibilities overseen by qualified staff providing a powerful vehicle for student learning and for supporting practice. Figure 3 relates to what is written above.

### Strengths and weaknesses of the evaluation tools

One of the strengths of this evaluation model is the combination of methods and the triangulation of the different

evaluation tools applied to different aspects of curriculum development, namely presage, process and product. To examine outputs against the Kirkpatrick evaluation framework we needed to apply a range of tools. For example, the IPE portfolio offered invaluable feedback to curriculum committees in revealing the subtle step-by-step learning across the curriculum (Table 3, Exemplar 13). As Carpenter & Dickinson (2008) argued, there is value in linking different aspects of the overall evaluation in a “stepwise” approach, so that learner attributes are linked with measures of programme integrity and impact and these in turn linked with subsequent outcomes in terms of practitioner behaviour and patient/service user benefits (Carpenter et al. 2007). Clearly applying different conceptual frameworks can help to sharpen understanding and move the curriculum to the next level of analysis; and this is further supported by the argument of Frye & Hemmer (2012) who indicate that a combination of methods of evaluation may be best suited to both the complexity of the field of practice represented by IPE, and to the integration of varying theoretical perspectives.

Our evaluation design provided the opportunity to follow the development of both novice and experienced IPE faculty members along their learning journey. Insights included the challenges for faculty development, such as training in the management of small group IPL facilitation and understanding the value added aspects of IPE for health and social care professional programmes, while highlighting the benefits for educators working on educational design and delivery for advancing personal and professional development (Table 3,



**Figure 3.** A flow diagram to illustrate the evaluation processes, application of theory to curriculum change or for faculty development.



Exemplar 14). In addition, the burden of engagement with IPL as additional to core uni professional learning resulted in an increased work-load for the IPE facilitators and new management structures were needed to plan and trouble shoot so that increasing workloads could be reconciled and support found to ensure that the benefits for personal and professional development were not compromised (Anderson et al. 2014).

## Discussion

The report of our evaluation of an entire IPE curriculum takes place after several years of on-going cyclical delivery. We used the conceptual framework model elaborated by Biggs, considering *presage*, *process* and *product* in constructing an approach which linked concrete evidence obtained in advance of and at the point of delivery (evaluation material), with more discursive and wider-ranging follow up, which probed each step of the curriculum, and was then more comprehensively articulated with the creative application of theory. To consider impact in more detail we aligned outcomes to the Kirkpatrick Model (Carpenter & Dickinson 2008). Not all of our methods have been implemented as comprehensively as we would like, with limited resources. We have, though, demonstrated the overall practicality and potential added value of an evaluation strategy which consciously and pro-actively links the stages in the process of preparing and delivering IPE, and the outcomes from a range of stakeholder perspectives (Yarbrough et al. 2011). This, we argue, provides a degree of empirical validation for those systemic models of evaluation developed by Biggs (1989) and others (Kirkpatrick 1996; Frye & Hemmer 2012).

We are not alone in trying to advance our understanding of IPE through considering the application of theory (Reeves & Hean 2013). Our results show that theory is a valuable tool in the curriculum design and to synthesise and help to explain our evaluation findings. However, overall we found it challenging to limit ourselves to testing out one theoretical model and argue that solutions for both evaluating and enhancing IPE rest with sequential application of different conceptual frameworks as Frye and Hemmer argue persuasively (2012). It is clear that there are only positive advantages to use an evaluation framework (Figure 2) which focuses on all elements of the learning experience from preparation to “product”, combined with considering all stakeholder views – students, teachers and patients (Biggs 1993).

One of the most important questions for those who establish pre-registration IPE is what makes for a good curriculum threaded throughout a profession-specific programme? We found that a progression of events starting with theoretical appreciation and moving into placement learning to examine the complexity of modern team working in a range of clinical settings is required. The most positive evaluations are for student engagement in practice (Anderson & Thorpe 2014). The learning with and from the patient/service user's voice and professional role models can develop a pathway of learning that appears to arrive at its goal of sensitising and equipping future practitioners for collaborative working.

However, preparation with theoretical application must come early.

There are still many unanswered questions relating to vertical and horizontal curriculum alignment and robust assessment methodologies that can be used to determine progression towards professional registration. We remain somewhat constrained in seeking to determine what learning moments influence student learning towards being “truly collaborative” and or “workforce ready” as envisaged by the World Health Organisation in 2010 (WHO 2010); but we support the proposition, strongly endorsed in our study by students across the range of professional disciplines, that learning together in practice is essential. Despite the successes we have claimed, we recognise that IPL is (or should be) consolidated while in practice.

The approach to education evaluation is becoming increasingly sophisticated but its progress is by no means complete. More insight is needed into the place of assessment and the role of validated measures of observable team-based behaviours. Although some tools for this are available, there is no agreed measure and management for valid and reliable results (Thistlethwaite 2012). We are also aware of the continuing challenges of demonstrating sustainable long term gains. The integrated evaluation framework that emerged from the process reported here represents a significant achievement. Nevertheless, it could have been a more straightforward process had we adopted a validated approach, such as the CIPP model (Frye & Hemmer 2012), from the outset, and tested the research questions being asked by the World Health Organisation concerning IPE (Gilbert 2014).

We are not presenting our evaluation design as a *fait accompli*, rather we look to share these experiences to propel the IPE community to consider whole and comparative programme evaluation using conceptual frameworks that can help to illuminate what works well, and why, and at the same time, takes forward IPE research. Indeed, although it was clearly not originally formulated as such, we could perhaps argue that our developing strategy has amounted to a form of “meta-evaluation” (Yarbrough et al. 2011), whereby each component is reviewed both in its own right, and in terms of its potential to contribute to the overall picture.

We were able to support the employment of our programme evaluator for part of this period, and some small grants were from the Higher Education Academy and other sources. Indeed, the small scale and diffuse nature of the funding have been beneficial in many ways, in enabling us to develop our overall strategy piecemeal and by a more or less logical progression. The programme has remained in place since 2005 but is currently under review with incoming senior HEI leads. Further work is planned (patient safety/simulation activities) and on-going cyclical reviews may bring changes.

## Conclusion

Comparisons of medical education curriculum approaches are beginning to illuminate the benefits of different learning

approaches and curriculum designs (Schmidt et al. 1996). Although rigorous experimental evaluation designs, such as Randomised Control Trials, might identify the best curriculum models, pre-registration curriculum, professional body requirements militate against using such designs. However, we can use multiple evaluation methodologies which reveal curriculum effects on participants and faculty. We suggest that those setting out to plan or re-design IPE curriculum establish clear and systematic research questions for their curriculum, underpin these by theory at the outset and test the questions systematically as their enquiries progress.

## Glossary

**Theory-driven curriculum evaluation:** An approach to evaluation design which chooses a theoretical approach which fits a programme's complexity. This type of approach ensures the setting of research questions which underpin the evaluation process. Such an approach should be able to identify that change has occurred as a result of the learning intervention evaluated.

Frye AW, Hemmer PA. 2012. Program evaluation models and related theories: AMEE Guide No. 67. *Med Teach* 34(5):e288–e299.

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## Note

1. "Curriculum" here means a series of different learning activities designed to advance learning over time. The word programme is used interchangeably with curriculum in this paper. IPE refers to interactive learning between learners from different professions as defined in the World Health Document of 2010.

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