

Evaluating IPC Education in the Workplace



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Introduction

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- Staff education and training is widely regarded as a pivotal measure to reduce the risk of healthcare-associated infection
 - ✦ Zingg et al, Lancet (2015)
 - Quality of evidence on education and training
 - ✦ 2 of 10 key components of hosp-level IPC
- Healthcare providers provide in-service education and training on IPC to their new and existing staff in varying degrees and through various methods
 - Typically has limited or no link to formal tertiary education structures
 - Although IPC programmes and practitioners devote much time and effort to teach HCWs, how effective is this?

What does the literature say about effectiveness of IPC education?

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- It's not good..
 - Ward DJ. The role of education in the prevention and control of infection: a review of the literature. *Nurse Education Today*. 2011;31(1):9-17.
- Review of 39 studies
 - no clear evidence of sustained positive effect on compliance with IPC precautions
 - unclear whether education alone has a significant and sustained effect on infection rates, whether it needs to be combined with other interventions or even if education has any role to play at all
 - questionable whether knowledge increase improves practice
- There is no rigorous and convincing evidence that education improves compliance with infection control precautions or reduces rates of infection, particularly in the long-term

Education does not work?

Nair, S. J Hosp Infect (2016) 94 130-132

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- Effectiveness of educational interventions to reduce the use of carbapenems - nothing changed
 - Intervention was meetings (content not disclosed); Focus group discussions (no detail); Dissemination of published papers (did anyone read them?)
 - ✦ All one off events over one month
 - Concluded - short education programmes are ineffective
 - ✦ Never evaluated the programme – went straight to outcome
- Hand hygiene teaching does not improve compliance
 - ✦ Dorsey S, et al 1996. Is handwashing teachable? Emergency Medicine 3 (4), 360–5
 - Intervention was posters, paper distribution and no formal teaching
- Were these education?

Industry does evaluation of training

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- Invests millions in training to gain a competitive advantage
 - Training investment is increasing because learning creates knowledge which differentiates between those companies and employees who are successful and those who are not
- Makes large investments in training and education and view training as a strategy to be successful
 - They expect outcomes or benefits to be measurable
- Evaluation provides data to demonstrate that training does provide benefit

What some think about training

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- “If we train them they will leave”
- Perhaps more worrying is what happens if we don't and they stay..
- Train people well enough so they can leave, treat them well enough so they don't want to
 - ✦ Richard Branson

Education vs. Training

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- Education
 - provides HCWs with a knowledge base and insight that act as a driving force behind future activities
 - ✦ There is a hugely motivational aspect to this
- Training
 - task-orientated within a specific working environment
 - helps staff to acquire skills to complete a procedure to a set standard
 - ✦ Clinical and non-clinical

“Good news, It’s Mandatory Training Day”

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Confession Time

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- I delivered around 1000 in-house training sessions in my NHS Career
 - I have no idea if they were effective
- People seemed to like them
 - So that's OK then
- Did it change anything?
 - I have no clue
 - Or do I?

Evaluations

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- Student rating is a traditional approach to the evaluation of education programmes
 - Educators should instead use self, peer, and mentor rating scales in addition to student rating scales to obtain a range of perspectives
 - ✦ Berk, R.A. (2013) *Medical Teacher*, 35:15-26.
 - These ratings will only give partial information

Student ratings vs. multiple sources of evidence

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- In healthcare education, ratings have not received the same level of research attention as other fields
 - There are many behaviours and skills defining teaching effectiveness which students are NOT qualified to rate
 - ✦ Tutor's knowledge and content expertise
 - ✦ Teaching methods
 - ✦ Use of technology
 - ✦ Course materials
 - ✦ Assessment instruments
 - ✦ Grading practices

Questionnaires

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- Questionnaires do not replace speaking to people and do not replace qualitative methods
 - If you need to ask why they answered a question in that way, you probably are using the wrong method
- The person filling in the form is disinterested, not paying attention, and will rush through it
 - Anything that can go wrong....
- So the design is important

Questionnaires 1

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- Question order matters (a lot)
 - Ask the most important question first
 - ✦ In one word, how would you describe the session?
 - Limit the number, eventually 'question fatigue' will sink in and answers will become erratic
 - ✦ too weak.
- Yes/no
 - only when it is an easy 'yes/no' question
- Ask questions from top to bottom
 - Columns from left to right lead to confusion, vertical responses seem to be better
 - ✦ Dillman DA. Mail and telephone surveys: the total design method. New York: John Wiley & Sons, Inc; 1978

Some guidelines for questionnaires 2

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- All questions on a 5 (or odd) point scale and symmetrical
 - Best scale (Likert)
 - ✦ Strongly agree, agree, Neither agree nor disagree, Disagree, Strongly disagree
 - ✦ An alternate is Excellent, Very Good, Good, Fair, Poor (For ratings)
- Question specific 5 point scale
 - How is the tea in Yorkshire?
 - ✦ Much too strong, A little to strong, About right, A little too weak, Much too weak
- Don't ask extra questions just because you can, ask only questions you will act on
 - “Now we would like to move on to Q. 618 concerning the health of your pet fish...”

Bias in questionnaire design

Choi B., Pak A. Prev Chronic Dis. 2005;2(1):1-13

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- Ambiguous question
 - lead respondents to understand the question differently than was intended and so to answer a different question than was intended
- Double-barrelled question
 - made up of two or more questions makes it difficult
 - ✦ for the respondent to know which part of the question to answer
 - ✦ for the investigator to know which part of the question the respondent actually answered
- Short question
 - may not be as accurately answered as questions that are longer

How to cheat

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- Manipulate
 - Get an answer you want by putting it after a question that has the desired answer in it
 - Bias towards an answer you want by using a 6 point scale
 - ✦ If there is an even number, people will deviate towards the positive
- Phrasing is important
 - People may say "yes" if you ask the question this way
 - ✦ Do think hand hygiene is important?
 - But probably will say "no" if you ask the question this way:
 - ✦ Is hand hygiene a problem for you?

Analysis

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- Don't be depressed if everyone doesn't 'strongly agree' that the training was 'excellent'
 - Respondents usually avoid ends of scales, try to be conservative and be towards the middle
 - ✦ Foddy W. Constructing questions for interviews and questionnaires: theory and practice in social research. Cambridge (United Kingdom): Cambridge University Press; 1993
 - Respondents are more likely to check "Agree" or "Disagree" than "Strongly agree" or "Strongly disagree"
 - ✦ Aday LA. Designing and conducting health surveys. 2nd ed. San Francisco (CA): Jossey-Bass; 1996

Model of Evaluation

Kirkpatrick (1967)

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- Industry expects good outputs from sales and manufacturing however make no effort to discover whether training depts are effective
- Proposed 4 levels of outcome evaluation
 - Level 1 – Reaction
 - Level 2 – Learning
 - Level 3 – Behaviour
 - Level 4 – Results
 - ✦ Assumption that each level will affect the subsequent level
- Has been criticised for not distinguishing between education (learning) and training (skill)
 - Can be overcome by the selection of appropriate tools

Kirkpatrick Level 1 - Reaction

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- A participant satisfaction measure
 - Were the participants pleased with the program
 - Perception of if they learned anything
 - Likelihood of applying the content
 - Effectiveness of particular strategies and the packaging of the course
- Measures participants reactions to the training program, including:
 - reactions to the overall program (outcomes)
 - ✦ “To what extent did you find the training useful?”
 - reactions to specific components of the program (processes) e.g.,
 - ✦ What aspect(s) did you most appreciate and find useful and what did you least appreciate and feel is most in need of improvement?
- Consider looking for delayed reactions

Example of Level One

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- How much did you know about this subject before taking this training?

Nothing		Some		A lot
1	2	3	4	5

- How much do you know about this subject after this training?

Nothing		Some		A lot
1	2	3	4	5

- Measures intent

- The question does not assess actual learning, it assesses perceived learning

More Level One

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- How likely are you to use some or all of the skills taught in this training in your work?

Not Very Likely

1

2

Likely

3

4

Very Likely

5

- Intent
 - Determine participants perceived relevance of the training
 - May correlate with the satisfaction learners feel

Level 2 - Learning

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- Measures what participants have learned from involvement in the program
 - What is measured needs to relate to what was covered in the program, e.g., learning objectives
- Typically covers knowledge, skills, or attitudes
 - Needs to include both rating scales & open-ended questions
 - Can include self-report & tests of actual knowledge

Level Two Alternative Strategies

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- Consider using scenarios, case studies, sample project evaluations, etc, rather than test questions
 - What would you do if.. Etc
- Develop a rubric of desired responses
 - Develop between 3 and 10 questions or scenarios for each main objective.

Level 3 - Behaviour

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- Measures transfer of knowledge, skills & attitudes from the training context to in-vivo or real-life contexts
 - Evaluate both before & after the program if practical
 - Can use survey, focus groups, interviews with students, mentors, staff
- Survey is a practical method
 - Self and peer are both valid

Evaluating Behaviour

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- Measure on a before/after basis
 - Otherwise how will you know if a change has taken place?
 - Use a control group if practical
- Allow time for behaviour change to take place & embed
- Survey or interview those who are in the best position to see change
 - Participant/learner
 - Supervisor/mentor
 - Subordinates or peers
 - Others familiar with the participants actions

Level 4 - Results

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- Nirvana – but not easy
- Measures “return-on-investment”, or the extent to which the training/education has produced results
- Some examples include –
 - Hard outcomes
 - ✦ Hard data for what was addressed during the training
 - Soft outcomes
 - ✦ Staff job satisfaction
 - ✦ Staff self-reporting of behaviour change

Measurement of Effectiveness

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- Outcome measures
 - Infection rates
 - ✦ (CLABSI, SSI, Transmissions etc etc)
 - Product usage (more or less)
 - ✦ Reduced (or increased) costs
 - Cleanliness assessment via quantitative methods
- Process measures
 - Adherence to standards; Compliance with interventions (and bundle)
- Many studies report these as positive following educational interventions
 - Majority do not look at whether this was sustained

Does teaching increase compliance?

Al-Hussami M, Darawad M. AJIC 41 332-6

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- Effectiveness of a nursing IPC educational program presented to nursing students before graduation
 - Students randomly assigned to receive defined IPC education
 - All had received some basic IPC in medical and surgical sessions
 - ✦ Pretest scores 12.45/30 (range 4-16)

- Hypotheses
 - When compared with a control group, nursing students who complete an infection prevention educational program will demonstrate
 - ✦ Increased knowledge of IPC precautions
 - ✦ better attitudes toward IPC precautions
 - ✦ increased compliance with IPC precautions

Does teaching increase compliance?

Al-Hussami M, Darawad M. AJIC (2012) 41 332-6

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- Knowledge
 - Assessed by test
 - ✦ 9 true/false and 21 multi-choice questions
- Attitude
 - 11 questions measuring attitudes toward choosing personal protective equipment (PPE), donning PPE and high-risk procedures
 - Responses used a 5-point Likert scale, ranging from 1, “strongly disagree” to 5, “strongly agree”
- Results
 - Participants in the experimental group demonstrated significantly better knowledge ($t = 19.15$; $df = 95$; $P = .000$) and attitude scores ($t = 2.29$; $df = 46$; $P = .04$) than in the control group

Does teaching increase compliance?

Al-Hussami M, Darawad M. AJIC 41 332-6

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- Compliance
 - Self-evaluated using a tool containing 15 items scored on a 4-point Likert scale, ranging from 1, “never,” to 4, “always,” with higher scores indicating better compliance with standard precautions
 - Chan R et al.. Int J Nurs Stud 2002;39:157-63
 - ✦ areas related to the use of PPE, disposal of sharps, disposal of waste, decontamination, and prevention of cross infection between patients
 - There was no significant difference in compliance when compared with the control group
- Spot the flaw?

Sustainability

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- “He that complies against his will,
Is of his own opinion still;
Which he may adhere to, yet disown,
For reasons to himself best known”
 - ✦ *‘Hudibras’* (1678) poem by Samuel Butler (1612-80)
- Trying to find out why the opinion has not changed is vital

Competency-based training

Salaripour & Perl (2013) CJIC 28(1) 13-16

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- Evaluation of mandatory training
 - Random professionals from various occupations and a mixture of hospital units
- Pre and post-training short questionnaires
 - new employees before and after IPC orientation sessions
 - Examined knowledge retention, included elements that captured knowledge, practice of and attitude to IPC
 - retention questionnaire given to staff employed at least one year and up to three years from initial employment
 - Both surveys included five multiple-choice questions
 - ✦ Each question was given one point
 - ✦ Points were added to give a maximum score of five

Results

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- 86% of hospital staff trained by Sept 2007
 - 207 pre-test and 244 post-test surveys were completed
 - 93 retention surveys
- Correct answers to all questions
 - Pre-test 32.8%
 - Post-test 53.6%
 - ✦ A significant difference between the knowledge level of the two stages of the surveys taken before and after the workshop was identified ($P < 0.0001$)
- Sustained?
 - Knowledge at one year was actually lower than pre-testing
 - Retention test 0.03%

Discussion

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- Knowledge gained was very short-term
 - retention drop in health workers that were tested at least a year after initial training is suggestive of the need for re-education at shorter intervals
- Nurses find that educational modules are more effective when nurses' needs are included in structuring their components
 - ✦ Cheng SM, et al Can J Infc Control, (2008) 23(3): 165-71

Effect of Training

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Ineffective (or no) training

- Organisational
 - Poor job performance
 - Low job satisfaction
 - Safety hazards and injuries
 - Lower patient satisfaction
 - Legal repercussions
 - Waste of resources
- For IPC
 - Infections
 - Transmission
 - Increased length of stay
 - Increased cost

Effective training

- Organisational
 - Improved Quality of Work
 - Better Team Performance
 - Increased Productivity
 - Improved employee health and Org. safety record
 - Increased patient satisfaction
 - ✦ Don't forget patient 'choice'
 - Staff Retention
 - Increased morale
- And some for IPC..

Don't be afraid to evaluate!

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- You may be pleasantly surprised
 - You will never be the worst evaluated part of Mandatory Training
 - ✦ That is the role of 'Data Protection' and others
- You will be able to demonstrate the value of training and of your team
 - and maybe it will help you argue for more access to training
- All training provided in the organisation should be evaluated in some form
 - that includes training provided by external providers