Development of a Medical Education Outcomes Impact Predictive Tool

Clarkson C[1], Legg E[2], Jones C[3]

[1]Clinically Current, Manchester, UK; [2]Halcyon Medical Writing, Glasgow, UK; [3]McCann Health, Glasgow, UK

Abstract

Objective: To develop a continuing medical education (CME)-impact predictive tool that will enable future CME teams to robustly predict the expected impact of standardized medical education programmes on target physician cohorts.

Study design: A prospective cohort study using physician-level data from a Clinically Current-designed and -administered medical education programme.

Study population: A large and heterogeneous sample of physicians employed by EU- and Canadian-based secondary care centres.

Data collection methods: A transparent and replicable medical educational programme will be administered to recruited physicians. The programme structure, based on best practice andragogy, is proposed as a standardized and generally applicable programme process for any medical educational intervention comprising five key steps.

Planned outcome: A Microsoft Excel-based tool enabling prediction of learning outcomes of future standardized medical education programmes delivered to heterogeneous physician samples.

Introduction

- Measuring the impact, outcomes and return on investment of independent medical education initiatives is becoming increasingly important, as funding, healthcare budgets and physicians' time become further restricted.
- To secure funding, continuing medical education (CME) providers are asked to anticipate the proposed impact of a programme, usually based on previous experience or literature; however, there is often a gap between the intended impact and the actual outcomes.
- There are numerous variables that could confound accurate measurement of CME outcomes. Without statistically robust analysis, we cannot confidently and accurately report what those extraneous variables are, nor can we control for them appropriately.
- Therefore, a more robust and accurate tool is needed to:
  - identify the key variables that influence optimal CME outcomes
  - quantify the effect size of identified variables
  - anticipate the best educational design and delivery channel for optimal CME outcomes.

Objective

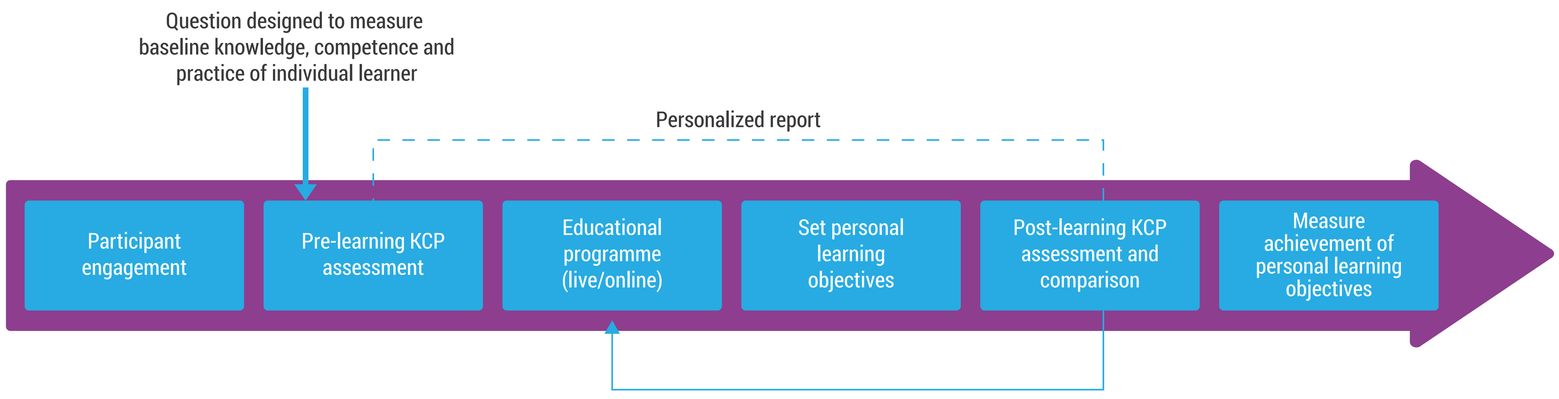
- To develop a CME-impact predictive tool that will enable future CME teams to robustly predict the expected impact of standardized medical education programmes on target physician cohorts.

Methods

Study design

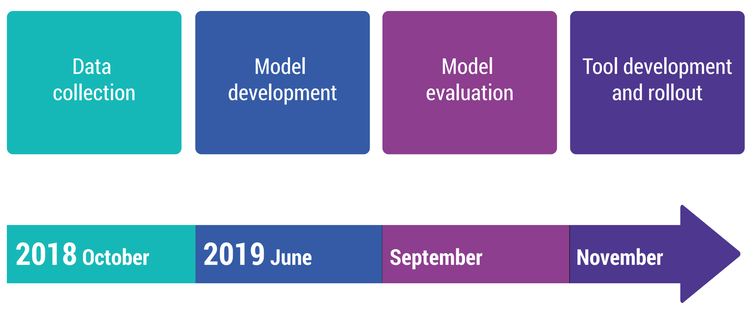
- This prospective cohort study will be conducted in physicians from EU- and Canadian-based secondary care centres. Eligible physicians will be required to partake fully in a standardized, Clinically Current-designed programme for any given medical educational intervention, comprising a pre-test, the educational intervention, a post-test, a 3-month initial follow-up, and a final 6-month follow-up (Figure 1).
- Baseline characteristic questionnaires will be completed by participants, providing data on demographic (e.g. age, sex, ethnicity, medical specialism, qualifications), environmental (e.g. practice type, practice location, public/private) and societal (e.g. caseload demographics, guidelines, restrictions) characteristics.

Figure 1: Blended learning programme design



KCP=Knowledge, Competence, Practice

Figure 2: Tool development process and timeline



- A learning outcomes prediction model will be developed using the statistical software package R to estimate the sign and degree of relationships between specific learning outcomes and key variables considered to plausibly influence those outcomes.
  - Variables included in the statistical models will include data related to participants' demographic characteristics, characteristics of their care institutions and the disease type in which they specialize.
  - Means, standard deviations and medians will be estimated for continuous recruit data, and frequency and percentages for categorical recruit data.
- Pre-programme data on participants' learning outcomes are being recorded; data on learning outcomes recorded soon after final delivery of the educational programme are being used to measure change in learning outcome on a pre–post basis. To model binary learning outcomes, multivariate logistic regression models are specified through a backward reduction approach, while multivariate linear regressions are specified for continuous learning outcomes.
  - The models will be run again using learning outcomes data collected as of the 3- and 6-month follow-ups. Estimated coefficients with 95% confidence intervals, standard errors and p-values for each time period of change measurement, including odds ratios from the logistic regression and simple coefficients from the linear model, will be inputted as fixed predictors into a Microsoft Excel framework.
    - A simple, transparent and aesthetically striking dashboard will be developed within the Microsoft Excel model, allowing users to observe the impact of the standardized Clinically Current-designed programme on each learning outcome of interest, while also enabling instantaneous observation of the change in impact caused by changing key individual underlying assumptions.
- The team used relevant skills, expertise in pedagogy and behaviour change, current evidence, physician/learner feedback and evaluation of various educational designs in practice to refine an effective blended learning programme for independent medical education (Box 1). The programme is adaptable enough to address specific educational needs in identified therapy areas and locations while maintaining structural integrity to enable side-by-side comparison of programme outcomes irrespective of specialty, geographical location, type of practice (i.e. general/specialist, hospital/private practice) and level of experience (i.e. years in practice).

Box 1: Considerations for the standardized programme design

- Based on ACCME definition of CME[1]
- Aligned with the four core principles of CME[2]
- Assumes achievement of level 5–6 outcomes[3]
- Social constructivist approach to adult learning[4–6]

ACCME=Accreditation Council for Continuing Medical Education; CME=continuing medical education

- Each individual aspect of the programme is standardized (e.g. Knowledge, Competence, Practice – assessments each have a set number of declarative knowledge, procedural knowledge, competence and performance questions). All learning activity and assessment data are hosted on edu@ClinicallyCurrent (https://edu.clinicallycurrent.com/), where each participant has a personalized account that contains relevant demographic data such as location, specialty, level of experience and practice type.
- Each independent medical education programme delivered by Clinically Current (assuming the design is the most appropriate method to meet educational needs) will be included into the study design. Data collection started in October 2018; anticipated completion is June 2019, or up until over 100 specialists in three different specialties have completed their relevant programmes (Figure 2). For reliability and validity of the tool, data will need to be collected from a minimum of 30 participants per specialty.
- Interim analyses will be conducted after each individual programme is delivered to assess efficacy and identify any issues with the study design.

Planned outcome

- The final tool will be a Microsoft Excel-based model designed to control for inputted data on recruit demographics and practice-based characteristics. The tool will be used to predict the extent of learning outcomes success that would be achieved by any given application of the Clinically Current standardized medical education programme when administered to heterogeneous physician samples.
- Predictions from the model could help inform CME teams of the likely usefulness of applying the programme to a given set of physicians. Alternatively, model predictions could help CME teams optimally prepare for the knowledge landscape aftermath of the programme, if administered.

References

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Disclosures

No potential conflicts of interest were reported by the authors.

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