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Perceived Impact of a Teacher Development MOOC on Self-Determined IEP Implementation

RESEARCH ARTICLE

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ABSTRACT

This study documents teachers' perceived impact of a massive open online course (MOOC) entitled The Self-Determined IEP: Supporting *Success for Students with Behavioural and Adjustment Difficulties* using Coldwell & Simkins' (2011) model for evaluating continuing professional development in education. Employing pre-experimental pretest post-test research design with no comparison or control group, the 55 participating teachers responded to four online questionnaires at pre-determined points over the course of the study. Findings indicate that, as regards self-determination and individualized education plan (IEP) implementation, teachers experienced significant growth in knowledge, an increased sense of self-efficacy in handling socially and behaviourally challenged children, and improved teacher practices. With few respondents having yet employed a self-determined IEP in the field, no definitive conclusions are available concerning student outcomes, however findings imply good potential. No significant shift in respondents' attitudes towards inclusive classrooms was noted. We discuss factors which contributed to findings in order to submit guidelines and possible avenues for future teacher training endeavours.

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INTRODUCTION

In current times, education is a rapidly evolving landscape wherein teachers are expected to constantly keep up with new processes and adjust their practices to fit an assortment of student profiles. In this context, continuing professional development (CPD) serves as a vital pathway to help educators in keeping their teaching practices on point (Lee, 2018). The quest for betterment has always been a fundamental part of the teaching profession's code of ethics (Darling-Hammond et al., 2017). More than simple knowledge dispensers, teachers are counted upon to provide learning environments that are all-at-once stimulating, inclusive in spirit, and geared to diverse learner needs (Zee & Koomen, 2016).

CONTINUING PROFESSIONAL DEVELOPMENT FOR TEACHERS

If society aims to generate a diverse multitude of positive outcomes, both for teachers and students alike, teacher CPD would appear to be an imperative driving force in achieving that objective. CPD provides teachers with a chance to explore new methods, to try out innovative approaches and to use more effective classroom strategies, thereby contributing to an ongoing developmental progression in professional practices (Basma & Savage, 2018; Darling-Hammond et al., 2017; Gracheva et al., 2020; Lynch et al., 2019). Furthermore, literature suggests that involvement in the CPD process tends to increase teachers' sense of self-efficacy (Omare, 2021; Saadati et al., 2023) and have positive effects on teacher retention (Coldwell, 2017; Scott et al., 2021; Smet, 2021; Toropova et al., 2021). Teachers' partaking in CPD translates into a richer and more stimulating educational experience for students, leading to more positive academic outcomes, higher motivation, greater engagement and hence, overall, a more successful schooling experience (Basma & Savage, 2018; Fletcher-Wood & Zuccollo, 2020; Kraft et al., 2018; Lynch et al., 2019; Yoon et al., 2007).

A plethora of continuing professional development activities are available in a range of formats – continuing education or university credit courses; seminars, conferences, and workshops; mentoring and professional learning communities – providing teachers with plenty of opportunities to further their job competency levels (Boulay, 2021; Gaudreau et al., 2021). Each of these CPD delivery methods nonetheless comes with a set of obstacles. Meta-analysis would seem to indicate that there are considerable discrepancies in CPD outcomes, dependent upon the way CPD is designed and delivered (Basma & Savage, 2018; Didion et al., 2020; Kraft et al., 2018; Lynch et al., 2019). Obstacles that reportedly hinder full participation centre around resources teachers tend to lack: time, proximity, substitute teachers, organizational support, and financial resources (Buczynski & Hansen, 2010; Darling-Hammond et al., 2017; Opfer & Pedder, 2011; Tooley & Connally, 2016). This speaks to the importance of more consciously devising CPD exercises that align with the professional realities experienced out in the field, in order to remove some known barriers and achieve higher attendance.

Measures of Effectiveness

A literature review conducted by Duchaine and Gaudreau (2023) helped identify key components that reportedly bolster teacher CPD effectiveness by tangibly improving their professional practices and, subsequently, boosting student success rates.

First and foremost, CPD activities must necessarily satisfy a need (Whitworth & Chiu, 2015) by covering evidence-based and proven-to-be-effective teaching practices that are directly applicable in day-to-day teaching (Darling-Hammond et al., 2017; Desimone, 2009). Some studies highlight the need for CPD design to be structured as an ongoing cyclical flow model (Cordingley et al., 2015; Walter & Briggs, 2012) which alternates between formal instruction and practical application as a way of facilitating the transfer of any acquired theoretical knowledge into real-life classroom practices (Dunst et al., 2015).

CPD activities must be scheduled at convenient times and seasons to avoid compromising or having negative repercussions on teachers' work volume, classroom schedules, and other duties, yet also last long enough to effect real change in teaching practices (Darling-Hammond et al., 2017; Desimone, 2009). While an exact number of hours has not been recommended anywhere in literature to guarantee effective outcomes (Darling-Hammond et al., 2017; Fletcher-Wood & Zuccollo, 2020), Desimone and Garet (2015) point out that there is, nonetheless, a general

consensus in the research field that teacher development programs should last between 15 and 20 hours and be spaced over several months.

To foster a school-wide collective reflection on practices (Leko et al., 2015), it is imperative for training to comprise active exchanges and collaborative exercises where participants can observe classroom practices, engage in discussions and share personal experiences (Darling-Hammond et al., 2017; Desimone, 2009). Similarly, Duchaine et al.'s (2024) study emphasizes the importance of collaborative exercises occurring among coworkers from the same school, in order that common experiences be shared.

Lastly, post-CPD follow-ups and coaching appear to support long-lasting shifts in practice (Desimone, 2009). In this respect, organizational support is key: school principals must ensure sufficient human and financial resources are readily available to properly support teachers in experimenting with new classroom management strategies (e.g., freeing up time, booking substitute teachers, giving sessions with a psychoeducator) (Darling-Hammond et al., 2017; Desimone, 2009).

Rigorously measuring CPD outcomes is a crucial step in assessing its effectiveness (Darling-Hammond et al., 2017; Guskey, 2003). In spite of this, education industry CPD outcomes remain under-investigated (Kirkpatrick & Kirkpatrick, 2016). It is common practice to deem participants' satisfaction levels as a sufficient measure of CPD effectiveness (O'Toole, 2009). Albeit, it has now been established that an attendee's satisfaction with a CPD experience is no guarantee of growth in teacher knowledge, in teacher skill, or in student achievement, as development is a complex and multifactorial process (Coldwell, 2017). Therefore, to adopt a more structured approach to assessing CPD outcomes for teachers, theoretical training evaluation models would be both a practical and judicious choice. Despite the number of research studies that explore CPD, the use of theoretical training evaluation models remains limited (Coldwell & Simkins, 2011).

MASSIVE OPEN ONLINE COURSES: A NOVEL APPROACH TO CPD

In light of all the aforementioned, accessible training delivery methods – such as massive open online courses (MOOCs) – have surfaced as promising avenues for teacher CPD. A MOOC allows teachers to attend high-quality training sessions which, for the most part, are typically free-of-charge, designed by academic experts, and much easier to fit into a teacher's demanding work schedules (Misra, 2018; Tømte, 2019; Yıldırım, 2022).

It so happens that a handful of research studies have already recognized the potential of MOOCs for teacher CPD delivery, remarking on the flexibility and autonomy that they grant end-users (Duchaine et al., 2024; Misra, 2018; Tømte, 2019; Yıldırım, 2022). That said, few studies have focused on the question of the outcomes yielded from teacher enrolment in MOOCs, whether it be on shifts in knowledge, shifts in beliefs, shifts in practices, attitudes or student engagement. Among the rare studies that address the various outcomes, Gaudreau and Duchaine (2021) and Misra (2018) can be cited as one that examines the potential of MOOCs as a teacher CPD delivery method. However, given the combination of their exploratory study design, their impact being measured at only one time point immediately after training delivery, and the fact that teachers had not had time to implement knowledge or apply it in practice, more extensive study of outcomes is warranted.

With this in mind, our study aims to fill the aforementioned outcomes void by documenting the perceived impact of a MOOC in order to gain a more comprehensive understanding of its potential as a teacher CPD delivery system. To date, no studies would seem to have examined a MOOC through the lens of a training evaluation model, making this a novel approach for research in the education field. Accordingly, this study should make a significant contribution to the body of research by adopting a structured assessment methodology.

THEORETICAL FOUNDATIONS

Over the years, researchers have devised and published models to assess the effectiveness of continuing professional development (CPD) initiatives. A brief appraisal of Kirkpatrick's (1979), Guskey's (2000) and Brinkerhoff's (1988) models ensues below, followed by a presentation

of our own model framework, inspired by the Coldwell and Simkins (2011) model for CPD evaluation in the field of education.

Kirkpatrick's (1979) model, renowned for its clarity and ease of application (Singh, 2013), comprises four assessment steps: 1) Participant reaction (satisfaction); 2) Knowledge acquisition and attitude changes (includes formal learning, know-how acquired, and shifts in mindset); 3) Behavioural impact (practical application of knowledge, skills and attitudes in the field); and 4) End result (Kirkpatrick & Kirkpatrick, 2016). Despite its popularity, this model neglects certain crucial CPD aspects for teachers, such as antecedent conditions (e.g., motivation levels, expectations, training needs, past experiences) and moderating factors (e.g., organizational support, available resources) that can influence outcomes (Guerci et al., 2010).

Guskey's (2000) model goes further than Kirkpatrick's with one crucial extra step in considering the organizational support teachers receive from their schools and within the work setting itself. This is a worthy addition, yet the model still has shortcomings as it does not address attendees' pre-training mindset (antecedents).

Brinkerhoff's (1988) model adds two steps beyond those in Kirkpatrick's model. It includes a prior needs-analysis to settle on training objectives and looks at the CPD planning and design process. While gainfully accounting for participants' needs, Brinkerhoff's model neglects other antecedents and moderating factors which might greatly influence a teacher's lived experience of CPD (Coldwell, 2019). In light of this, it seems that none of these training evaluation models fully captures the complexity of teacher CPD, hence furnishing a somewhat incomplete assessment.

In response to the aforementioned shortcomings, Coldwell and Simkins (2011) pioneered a new model using a contextualized approach to better situate the participants' realities within the CPD. Setting itself apart from the aforementioned models, it includes antecedents as well as some moderating factors, giving a more comprehensive picture of the overall CPD process. This holistic approach also accounts for the complexities of learning contexts (Coldwell, 2019). Henceforth, the Coldwell and Simkins theoretical framework presents as particularly well-suited to encompass the complexities inherent to teacher CPD initiatives. Figure 1 shows Coldwell and Simkins' (2011) training evaluation model, which has been slightly modified to fit this study.

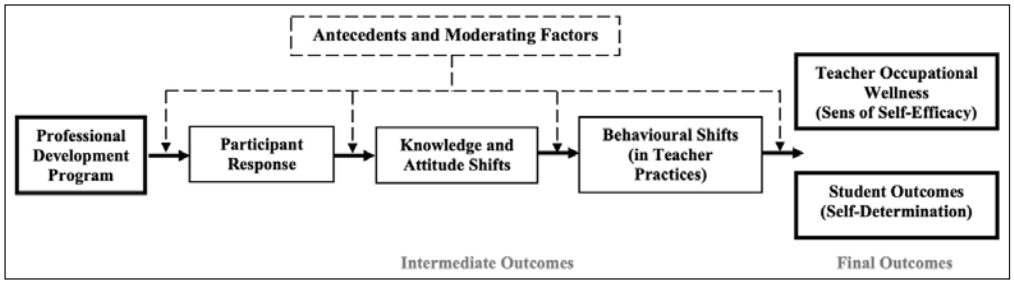

Figure 1 A Modified Version of Coldwell & Simkins' (2011) Training Evaluation Model.

We chose to first examine the Intermediate Outcomes, listed in Figure 1 as (1) Participant Response, (2) Knowledge and Attitude Shifts, and then (3) Behavioural Shifts (in Teacher Practices). The model then examines Final Outcomes, namely the training's impact on both Teacher Occupational Wellness – specifically, their Sense of Self-Efficacy, and then Student Outcomes – specifically, their Self-Determination.

DESCRIPTION OF VARIABLES

It is important to state from the outset that this article solely addresses a portion of the research findings resulting from the aforementioned study that sought to assess the perceived impact of a MOOC through the lens of Coldwell and Simkins' (2011) training evaluation model. Herein, the focus remains on four of the six variables in our modified Coldwell and Simkins (2011) model, those being Knowledge and Attitude Shifts, Behavioural Shifts, Teacher Occupational Wellness, and Student Outcomes – all of which are more fully defined below. Participant Response is addressed in an article by Duchaine et al. (2024) that reports high satisfaction levels among MOOC attendees, further supporting its potential as an effective teacher CPD avenue.

The **Knowledge and Attitude Shifts** variable refers to any formal learning that takes place along with shifts in perspectives and mindsets that result from CPD endeavours. For the purposes of this study, we were expressly documenting teachers' behaviour-based attitudes towards inclusive education for socially and behaviourally challenged children as an indicator of whether teachers seemed open to adjusting their workplace practices to meet such students' needs. As for knowledge, our aim was to document any increased know-how regarding self-determination and Individualized Education Plan implementation. Coldwell and Simkins (2011) stress that, when measuring formal learning, criteria should align directly with the explicit training program objectives. This can be assessed immediately upon CPD completion (Kirkpatrick & Kirkpatrick, 2016).

The **Behavioural Shifts (in Teacher Practices)** variable refers to any formal knowledge (acquired during CPD) which teachers then translate into real-life practical application. By mesuring shifts in teachers' workplace behaviours and practices, it becomes obvious whether the reported formal learning outcomes have in fact achieved the desired transformational effect on professional practice. In this study, the practices we were documenting specifically concerned the application of self-determined Individualized Education Plans (IEPs). It is worth mentioning that, as it is understood that shifts occur gradually and progressively as teachers experiment and adopt change (Coldwell, 2019), the behavioural shifts were measured across time (three to six months after the MOOC).

Occupational wellness encompasses the overall sense of satisfaction with one's work situation, stemming from an ability to take appropriate action and make sound choices whilst accounting for social, environmental and individual factors (Laguardia & Ryan, 2000). Said otherwise, to attain a sense of workplace well-being, a person must achieve goals and meet standards that satisfy one of the three fundamental psychological needs (autonomy, competence or relatedness) (Laguardia & Ryan, 2000). For the purpose of this study, the **Teacher Occupational Wellness (Sense of Self-Efficacy)** variable refers to a teacher's belief in their own ability to effectively work with socially and behaviourally challenged children.

The **Student Outcomes (Self-Determination)** variable refers to children's tendency to use self-determined behaviours at school. Self-determination is defined as a child's ability to invest in their own future, to regulate their own emotions, and to exercise freedom according to their own will (Field et al., 1998). Generally speaking, fostering self-determination involves: fostering a student's self-awareness and self-worth; helping children feel effective and in control of life; defending and advocating for children's rights; encouraging children to set and work towards goals, to make choices and decisions, and to solve problems; and, to aid children in developing their own individual perspectives and internal dialogue (Wehmeyer & Field, 2007). From the standpoint of students being successful at school, there is much evidence pointing to the fact that teachers should undeniably be directing their efforts towards building student self-determination levels as it lowers absenteeism and drop-out rates among students who adopt it (Blanchard et al., 2004). Futhermore, those with higher self-determination levels are more likely to adopt proactive behaviours, to steer their own educational course, and to persevere when facing obstacles (Field et al., 1998).

CONTEXT

A MOOC Entitled *the Self-Determined Individualized Education Plan: Supporting Success for Students with Behavioural Difficulties and Social Maladjustments*

The acronym MOOC lives up to its name as a way of delivering well-thought-out and expertly designed content to a potentially massive (*M*; unlimited number of participants) audience in an open (O; free of charge, open access platform, for anyone to enrol) online (O) course (C) format (De Barba et al., 2016; Karsenti & Bugmann, 2016). In a MOOC, participants are engaged in a learning process that respects their pace, availability and need for commitment, and aims to update their knowledge in a variety of ways. (Bonafini, 2017). The MOOC appraised in this study aims to familiarize school staff – working in both primary-school and secondary-school settings with students aged 5–17- with the IEP process and tools described in the "I have my IEP! Tool Kit". The Tool Kit was itself developed by a research working group to help schools adopt self-determination-based Individualized Education Plans (IEPs) for students experiencing adjustment challenges. The MOOC comprises three broader learning objectives, which are: 1)

help participants to fully grasp the self-determined IEP set up and design process; 2) promote active participation by all involved IEP parties; and 3) explore a range of tools to implement an IEP focused on self-determination for students presenting with social or behavioural challenges.

Course Completion Modes

The 30-hour course was open for registrants to attend from August 15 to December 9, 2022 (across 17 weeks) with live support. Subsequently, registrants had ongoing access to course content (e.g. lectures, videos) but without live discussion forums and without live pedagogical support. To meet differing learner profiles, the MOOC had two course completion modes: an intensive theoretical mode and a more progressive combined theory-and-practice mode wherein learners experimented with the *"I have my IEP!"* tools and the proposed theoretical approach in their respective school settings with one or more students as part of their course assignments.

Pedagogical Approach

The MOOC was specifically designed for self-paced study in a remote instruction environment. The course material and structure meant learners could manage their own study process, timeline and pacing within the given time-frame. An instructional team structured and guided participants by monitoring discussion forums daily and providing daily feedback during the live-support period.

The MOOC comprised six modules lasting approximately thirty hours in all, and used a variety of instructional formats such as lectures, video capsules, computer graphics, case studies, discussion forums for sharing and reflection exercises, competency development activities, and formative quizzes. Summative assessment exercises (aligned with course objectives) confirmed the level of knowledge acquisition and skill development. Course content was designed by a multi-disciplinary team of researchers and education-industry experts (e.g., pedagogical advisors, psychoeducators).

OBJECTIVES

Our study's general aim was to assess the perceived impact of this MOOC offered by Université Laval and entitled *The Self-Determined IEP: Supporting Success for Students with Behavioural Difficulties and Social Maladjustments* (IEP MOOC). On a more specific level, using a modified version of Coldwell and Simkins' (2011) training evaluation model, we sought to document:

1. **Knowledge Shifts** related to self-determination and IEP implementation;
2. **Attitude Shifts** related to inclusive classrooms incorporating maladjusted children;
3. **Shifts in Teachers' Sense of Self-Efficacy** insofar as own ability to effectively work with socially and behaviourally challenged children;
4. **Behavioural Shifts in Teacher Practices** related to self-determined IEP usage in school settings;
5. The **Observable Impact of Self-Determination on Children using IEPs**.

METHODOLOGY

This quantitative study employed pre-experimental pretest post-test research design with no comparison or control group. A single group was assessed prior to attending the Individualized Education Plan Massive Open Online Course (IEP MOOC) (T0) as well as afterwards (T1, T2, T3) with a view to document any shifts in our chosen dependent variables (see Figure 2 for chronological timeline and variables collected per time point). All data was collected through a series of four online questionnaires.

STUDY PARTICIPANTS AND SURVEY PROCEDURE

The study's target population consisted of teachers attending an Individualized Education Plan Massive Open Online Course (IEP MOOC) in the Fall of 2022. Sampling was based on non-probability convenience sampling. The core inclusion criteria were 1) to be registered to attend the MOOC in question, entitled *The Self-Determined IEP: Supporting Success for Students with*

Behavioural and Adjustment Difficulties in Fall 2022; and 2) to be a teacher employed on a temporary or permanent basis in mainstream and/or special education classrooms.

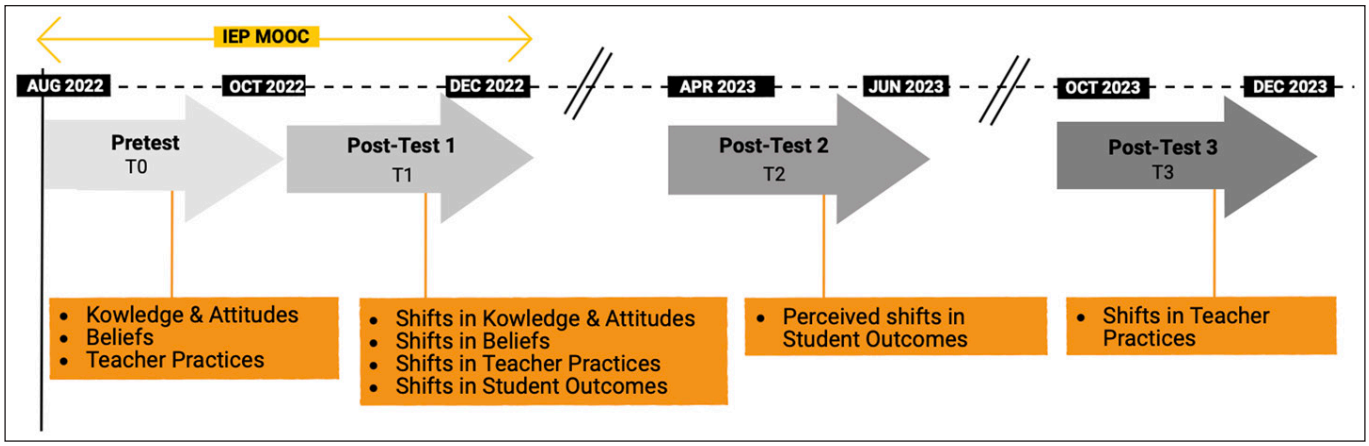

Figure 2 Chronological Timeline for the Study.

Having obtained ethical approval from the principal investigator's university, an invitation was sent by email, describing the nature of the research and its implications, to everybody who had registered (N = 6998) for the MOOC (among them teachers, support staff, school principals and specialists) in order to recruit study participants. The email emphasized that participation in the study was voluntary and an entirely separate endeavour from attending the training itself.

Teachers who had elected to participate in the study (n = 72) were invited on a voluntary basis to complete the first online questionnaire (T0) prior to attending the MOOC training session (pretest). A week after attending, another email questionnaire (T1) was sent only to those who had completed the first one. Then, three months after the IEP MOOC was held, those who had completed both the pretest (T0) and the first post-test (n = 61) received another online questionnaire by email to complete a second post-test (T2), once again on a voluntary basis. Lastly, a year after attending the MOOC, those who had completed T0, T1 and T2 surveys (n = 58) were invited to complete post-test T3. In the end, 55 teachers had completed surveys at all four time points.

It is worth noting that only study participants who had been working with an IEP in the current school year were asked to answer certain questions which documented practices associated with self-determined IEP implementation and the perceived impact on students. Respondents were asked: "*During the current school year, have you had to set up an IEP for a student?*". For those who answered "no", the questionnaire ended promptly. In all, 26 teachers filled out the questions which documented IEP implementation practices at T1 and 10 teachers at T3. For the questions which documented perceived impact on students, 26 teachers responded at T1 and 20 teachers at T2. Table 1 outlines characteristics for the final 55 participants.

Twenty-seven percent of study participants stated they had attended the training with coworkers, providing further valuable opportunities for them to share and discuss the content. With respect to course completion mode, 71% of study participants had signed up for the purely theoretical program and 29% for the combined theory-and-practice program with 86% completing the training in under 15 weeks across both completion modes.

SURVEY INSTRUMENTS

An online questionnaire at T0 documented teachers' prior knowledge, attitudes, beliefs and practices. The T1 online questionnaire documented those same variables in addition to the CPD's perceived impact on students. Then, the T2 online questionnaire documented solely the perceived impact on students, and T3 solely teacher IEP practices.

The online questionnaire documenting teacher knowledge insofar as IEP implementation and self-determination comprised 17 questions (Cronbach's α at T0 = .68; at T1 = .58). Respondents answered multiple-choice questions related to content broached during the IEP MOOC (e.g., *Who can potentially run or lead an IEP Meeting?)*. Note that, for this sub-section, the Means shown in the findings should be understood as a test score (/17).

VARIABLES	*n* (%)	MEAN (SD)
Job Category		
Preschool/Primary	33 (60)	
Secondary/Adult	19 (34)	
Primary & Secondary	3 (6)	
Classroom Type		
Mainstream	48 (87)	
Special Education	7 (13)	
Age		39.29 (8.3)
Sex		
Female	45 (82)	
Male	10 (18)	
Country of Origin		
Canada	38 (69)	
Elsewhere	17 (31)	
Years of Experience		11.31 (7.9)

Table 1 Demographic Breakdown of Sample (*n* = 55).

The online questionnaire documenting teachers' attitudes towards inclusive education for socially and behaviourally challenged children was inspired by Massé et al.'s (2018) French-language adaptation of Mahat's (2008) *Multidimensional Attitudes Toward Inclusive Education Scale* and comprised seven items (Cronbach's α at T0 = .81; at T1 = .93). A six-point Likert scale ranging from 1 (*completely disagree*) to 6 (*entirely agree*) was used to ask respondents how strongly they agreed or disagreed with the seven statements (e.g., *I'm willing to modify my practices to work with children experiencing maladjustments in order to foster their inclusion in mainstream classrooms*).

The online questionnaire documenting teachers' beliefs in their own ability (self-efficacy) to effectively work with socially and behaviourally challenged children comprised 10 items which were modified from Zhang et al.'s (2018) *Student Teachers' Efficacy Scale for Teaching Students with Disabilities*. We utilized three of the scale's four subscales with a six-point response framework ranging from 1 (*zero competence*) to 6 (*very competent*) to collect respondents' own perceived competency level for each item. Table 2 contains our scale sub-sections, number of items, sample items and internal consistency over two points in time.

SCALE SUB-SECTIONS	ITEMS (*n*)	ITEM SAMPLE	CRONBACH'S α T0	CRONBACH'S T1
D1 – Behaviour-based instruction strategies for children presenting with social and behavioural challenges	4	Fostering a student's level of self-determination	0.85	0.88
D2 – Identification and assessment of children presenting with social and behavioural challenges	3	Knowing which assessment, observation and record-keeping tools I can use to track student behaviours	0.87	0.83
D3 – Ethical dimensions	3	Ascertaining the validity of moving forward with an IEP for a given student	0.69	0.81

Table 2 Sub-Sections for the Sense of Self-Efficacy Scale (adapted from Zhang et al., 2018).

The online questionnaire documenting practices associated with self-determined IEP implementation were taken from the *Inventaire des pratiques relatives à l'établissement des PIs pour les élèves présentant des difficultés d'adaptation* [List of Practices Used in IEP Design for Children Experiencing Adjustment Challenges] by Gaudreau et al. (in preparation) which is a unidimensional scale comprised of 19 items (Cronbach's α at T0 = .85; at T1 = .84; at T3 =

.93). Respondents stated the frequency with which they adopted each practice listed (e.g., *I ask for an IEP to be created when I notice a child persistently struggles)* on a scale ranging from 1 (*never*) to 6 (*always*).

The online questionnaire documenting the observable impact of self-determination on children using IEPs was further modified from Massé et al.'s (2005) already modified version of the French-language adaptation of Kazdin et al.'s (1992) unidimensional scale *Therapist's Evaluation of Child Treatment* comprising nine items (Cronbach's α at T1 = .98; at T2 = .97). A six-point Likert scale ranging from 1 (*completely disagree*) to 6 (*entirely agree*) was used to ask respondants how strongly they agreed or disagreed with the seven statements (e.g., *The practices I adopted as a result of the MOOC IEP training had a positive impact on autonomy for the targeted students)*.

DATA ANALYSIS

Quantitative data analysis was conducted using *IBM SPSS Statistics v28* software. Firstly, descriptive analyses were conducted (means and standard deviation). Then, paired sample *t* tests were carried out to calculate the variable discrepancies at different times. A one-tailed test was used, as there was an underlying assumption in this study that each variable would either remain stable or improve subsequent to teachers' MOOC attendance. No Bonferroni correction was employed due to the relatively small sample size. Nonetheless, to mitigate this as a potential limitation, nonparametric testing (Wilcoxon signed rank test) was done and corroborates our findings.

FINDINGS

Results of data analyses for each of the study's research objectives are shown below. For illustrative purposes, some of the items with the most significant shifts per variable have been shared.

THE IEP MOOC'S PERCEIVED IMPACT ON TEACHER KNOWLEDGE

Paired sample *t*-test results show statistically significant growth in teacher knowledge between T0 and T1 (see Table 3).

Table 3 Shifts in Teacher Knowledge Between T0 and T1.

PRETEST T0	POST-TEST T1	*t TEST*	
Mean (*SD*)	Mean (*SD*)	*t*(*df*)	*p*
9.96 (3.01)	11.13 (2.44)	–2.440 (54)	0.009

Among all items, the greatest knowledge shifts seem to centre around a student's role during the IEP Meeting and a teacher's role in fostering a child's self-determination on the behavioural level.

THE IEP MOOC'S PERCEIVED IMPACT ON TEACHER ATTITUDES

Paired sample *t*-test results were inconclusive on whether there was a shift in teacher attitudes between T0 and T1 (see Table 4).

Table 4 Perceived Shifts in Teacher Attitudes Between T0 and T1.

PRETEST T0	POST-TEST T1	*t* TEST	
Mean (*SD*)	Mean (*SD*)	*t*(*df*)	*p*
5.48 (0.50)	5.44 (0.57)	0.417 (54)	0.34

THE IEP MOOC'S PERCEIVED IMPACT ON TEACHERS' SENSE OF SELF-EFFICACY

Paired sample *t*-test results show statistically significant increase in teachers' perceived sense of self-efficacy between pretest T0 and post-test T1 on all three scale sub-sections (see Table 5).

Among all scale items, the greatest perceived shifts in self-efficacy between T0 and T1 appear to be the teachers' belief in their ability to assess student self-determination levels and then tailor an IEP Meeting to match a student's self-determination levels.

SCALE SUB-SECTIONS	PRETEST T0	POST-TEST T1	*t* TEST	
	Mean (*SD*)	Mean (*SD*)	*t*(*df*)	*p*
D1 – Behaviour-based instruction strategies for children presenting with social and behavioural challenges	3.96 (0.91)	4.77 (0.74)	–5.294 (54)	<0.001
D2 – Identification and assessment of children presenting with social and behavioural challenges	4.05 (0.96)	4.69 (0.73)	–3.803 (54)	<0.001
D3 – Ethical dimensions	4.32 (0.81)	4.81 (0.81)	–3.144 (54)	0.001

Table 5 Perceived Shifts in Teachers' Sense of Self-Efficacy Between T0 and T1.

THE IEP MOOC'S PERCEIVED IMPACT ON TEACHER PRACTICES

Paired sample *t*-test results show that, in statistical terms, teachers self-reported that there were significantly higher adoption rates for the targeted teacher practices at T1 compared with T0 (see Table 6).

PRETEST T0	POST-TEST T1	*t* TEST	
Mean (*SD*)	Mean (*SD*)	*t*(*df*)	*p*
4.53 (0.74)	4.93 (0.84)	–2.677 (25)*	0.006

Table 6 Perceived Shifts in Teacher Practices Between T0 and T1.

Among all items, the greatest perceived shifts in practices that emerge between T0 and T1 concern the level of support given to a student during an IEP Meeting in order to foster more active student involvement and in helping students reflect upon their own personal priorities.

To investigate the sustainability of reported post-training practice shifts over time, a fourth time point (T3) was included. With only 10 teachers responding to this last survey, the *t*-test results are shown for informational purposes only. As Table 7 shows, descriptive analyses would seem to indicate that T1 findings held true.

POST-TEST T1	POST-TEST T3	*t* TEST	
Mean (*SD*)	Mean (*SD*)	*t*(*df*)	*p*
5.13 (0.99)	5.18 (0.72)	–0.112 (9)	0.457

Table 7 Perceived Shifts in Teacher Practices Between T1 and T3.

PERCEIVED IMPACT ON STUDENTS

At post-test T1, according to teachers, the intervention methods which they adopted subsequent to the training sessions most substantially contributed to students having a more solid grasp of the IEP process insofar as how it works and its usefulness, along with greater overall self-awareness (own needs, strengths, challenges faced).

To investigate sustainability over time, a second round of data (T2) was collected for the perceived impact on students. With only 20 teachers responding to this survey, *t*-test results are shown for informational purposes only. Findings show no difference at T2 compared with T1 which seems to indicate that the reported positive effects hold true over time (see Table 8).

POST-TEST T1	POST-TEST T2	*t* TEST	
Mean (*SD*)	Mean (*SD*)	*t*(*df*)	*p*
5.38 (0.74)	5.33 (0.61)	0.469 (19)	0.322

Table 8 Perceived Impact on Students.

DISCUSSION

The core objective of this study was to examine the perceived impacts of the IEP MOOC. More specifically, it was to document shifts in teacher knowledge (regarding self-determination

and IEP implementation), shifts in teacher attitudes (towards inclusive classrooms), shifts in teachers' sense of self-efficacy (insofar as effectively intervening with maladjusted student populations) and shifts in teacher practices (regarding self-determined IEP implementation). The last objective was to document any observed and/or perceived impact on children with IEPs insofar as self-determined behaviours were concerned.

Our findings show significant positive developments between T0 and T1 in three key areas, those being teachers' formal knowledge of IEP implementation and self-determination; teachers' belief in their own ability to intervene effectively with socially and behaviourally challenged children; and teachers' self-reported adoption of the targeted self-determined IEP practices. These observations align with other studies that found MOOCs can contribute positively to teacher skill development on precise topics (Misra, 2018; Taranto et al., 2021; Taranto et al., 2020). The IEP MOOC design features, its flexible completion options and its delivery method may also have played a role in our findings. To begin with, the longer 17-week time-span over which the MOOC was available provided those enrolled in the combined theory-and-practice program with ample time to assimilate the formal theoretical content while experimenting in their respective job settings. According to Darling-Hammond et al. (2017), the longer training delivery time-span may have contributed to the positive results we observed. Additionally, the MOOC's flexible scheduling feature meant individuals could attend at their convenience, hence increasing both active involvement and motivation on the part of teachers (Duchaine et al., 2024). Similarly, Desimone and Garet (2015) stress that the scheduling of CPD activities at opportune moments – without negative repercussions on teachers' workload, classroom schedules, and other duties – is likely to considerably contribute to furthering their skills.

The fact that the MOOC content and lesson design covered both theoretical and practical aspects of self-determined IEP implementation seems to have played a role in the observed shifts. Furnishing registrants with tools which were directly applicable to their daily work realities is likely responsible, in part, for a translation of the theoretical knowledge into real daily practices for teachers (Cordingley et al., 2015; Dunst et al., 2015; Kumar & Kumar, 2020; Sims et al., 2021). The fact that this particular MOOC was co-created by a multidisciplinary team comprised of both academic and field experts, naturally led to high-quality connections being drawn between theory and practice (Roy et al., 2016).

Additionally, the daily online support available through the program's pedagogical coaches, along with formative and summative assessment exercises, aided in substantiating and validating participants' acquisition of the new skillsets, and would hence seem to have reinforced their own sense of self-efficacy when it came to intervening effectively with children presenting with adjustment challenges, leading to even further adoption of self-determined IEP practices (Gaudreau, 2013).

Findings also indicate there was no significant shift in teacher attitudes towards inclusive education for socially and behaviourally maladjusted students between T0 and T1. These findings highlight the underlying complexities inherent to shifting teacher attitudes towards inclusive classrooms. While knowledge and practices documented herein are linked directly to the adoption of self-determined IEPs, the documented attitudes are linked, in a different manner, to inclusive schooling (for students presenting with social and behavioural difficulties). Given that the IEP MOOC was not intentionally designed to modify teacher attitudes towards student inclusion, the absence of any significant shifts is not surprising. Positive teacher attitudes towards inclusive education for this specific student population have been linked to teachers who are given sufficient training on how to discern, perceive and handle behavioural transgressions (Drysdale et al., 2007; Ernst & Rogers, 2009; Ross-Hill, 2009) and to those with suitable support and mentorship on hand (Avramidis & Norwich, 2002). Moreover, it is worth acknowledging the inherent complexity of people's attitudes, as well as the amount of ongoing support and substantial time investment required to bring about attitudes shifts (Massé et al., 2020).

Findings on the perceived outcomes in school settings, from the teachers' perspectives, concerning their adoption of self-determination-buiding IEP practices with this target student population suggest that students would seem to be adopting more self-determined behaviours than before. It is worth specifying that the perceived impact of MOOC on final student outcomes (as a direct result of teacher practice shifts) has scarcely been studied. To this day, no study has provided any clear answers. Nonetheless, it is evident that improving teacher skillsets leads to

potential positive outcomes for children and their schooling experience (Tanveer et al., 2021; Wallace, 2009).

When assessing the continuity of teacher practice shifts and student self-determination outcomes over time, findings show the positive effects observed at T1 would seem to remain consistent over time. It is important, however, to note that although these findings are encouraging, they should be interpreted with caution given the lower number of respondents, meaning no definitive conclusions can be drawn. Nevertheless, it appears that teacher self-efficacy beliefs play a crucial role in adopting newer practices (Garvis et al., 2011). Considering that teachers need to feel that any new practices proposed will in fact render them more effective as teachers for any long-lasting change to occur (Lamarche & Durand, 2022), we can infer then that the reportedly improved sense of self-efficacy could positively affect the chance of a lasting effect on practices.

It is crucial to remain cognizant of the fact that implementing the self-determined IEP approach taught in the MOOC does not depend solely upon a teacher's willingness. Sound implementation of IEPs in school settings requires a collaborative effort on the part of various parties in the student entourage (e.g., school management, support staff, specialists, parents). While some teachers might very well have modified their own work practices, other staff in the same setting might quite possibly be reticent to try out the suggested approach (e.g., a teacher prepares a student for active involvement the IEP Meeting but the principal refuses to allow it). Relatedly, Duchaine et al.'s (2024) findings stress the importance of taking the IEP MOOC training as a school team. To that effect, teachers consider that the opportunity to learn jointly is an essential building block for a meaningful training experience and for the proposed approach to be rolled out collaboratively in their respective work settings (Duchaine et al., 2024). Our findings highlight the value of organizational support and mentoring, as well as peer-to-peer interaction in the CPD context for teachers (Leko et al., 2015; Tzovla et al., 2021). Along these same lines, Guskey and Yoon (2009) bring up the notion that organizational support, most notably in terms of human resource provision, is a key factor in securing long-lasting CPD outcomes for teachers.

CONCLUSION

As with any research endeavour, this study naturally comprises limitations which should be effectively taken into account when interpreting its findings. Herein, a key limitation is the absence of a control group, somewhat inhibiting the certitude of our findings (Fortin & Gagnon, 2022). It is impossible to declare with absolute confidence that any shifts observed can in fact be attributed to the IEP MOOC and not to other personal, organizational or contextual factors. It is also worth noting that our findings are based on the sample group's perceptions, introducing a potential bias (Wallace et al., 2020). The subjective nature of our chosen approach can result in study participants over- or under-estimating the perceived effects. The smaller sample size precludes any broad generalization to overall teacher populations (Thorlund & Mills, 2012). Furthermore, it remains possible that the observed shifts are partly due to a novelty effect (Schomaker & Meeter, 2018). Hence, further research is required to investigate all these hypotheses and substantiate the findings.

Despite the aforementioned limitations, the results suggest the IEP MOOC had a positive impact on teacher knowledge, sense of self-efficacy and practices. While still exploratory, encouraging student outcomes were also reported. It is worth reiterating that few, if any, other studies have assessed MOOC effectiveness using a robust evaluation model that accounts for the complexities inherent to CPD initiatives for teachers. Future avenues worth exploring could be a comparative analysis with a control group to gain a more precise picture of the IEP MOOCs exact impact, as well as a look at whether any individual, organizational or contextual factors may have influenced the reported shifts herein. Special attention could be given to the continuity of the reported effects over time, with a deeper exploration of the factors contributing to any permanence in shifts. In closing, it is clear that the findings herein provide practical hints for future CPD planning endeavours. Those responsible for teacher training can benefit from the conditions for effectiveness we established here, leveraging opportunities for positive CPD outcomes for teachers and, ultimately, for children in need of social or behavioural adjustment support.

DATA ACCESSIBILITY STATEMENT

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

ETHICS AND CONSENT

This project has been approved by Université Laval's Research Ethics Committee: 2022–084/30/03/2022.

COMPETING INTERESTS

The authors have no competing interests to declare.

AUTHOR CONTRIBUTIONS (CRediT)

Marie-Pier Duchaine: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Validation, Visualization, Writing – original draft; Nancy Gaudreau: Conceptualization, Data curation, Supervision, Writing – review & editing; Éric Frenette: Methodology, Software, Supervision, Validation, Writing – review & editing. All authors have read and agreed to the published version of the manuscript.

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