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Does an Experience-Based and Practice-Oriented Approach in Coaching Education Influence Coaching Efficacy Positively?

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ABSTRACT

Coaching education is previously suggested to have a positive influence on coaching efficacy among coaches in sport. However, little is known about whether differences in learning approaches in formal coaching education lead to various outcomes in coaching efficacy. With this as a background, the current study explores whether coaching efficacy varies between coaches with different types of formal educational background. Special focus is put on the experience-based and practice-oriented «Topptrener» education programs. A sample of 614 Norwegian coaches from different sports such as cross-country skiing, cycling, athletics, soccer, and handball participated in the investigation. The coaches were split into three groups based on their formal educational background: (1) coaches with «conventional sport-related higher formal education», (2) coaches with «no sport-related higher formal education», and (3) coaches with «experiential and practice-oriented formal education through the 'Topptrener'-programs». When possible, gender differences were accounted for, and years of education and coaching experience were used as covariates; the «Topptrener coaches» showed significantly higher coaching efficacy than coaches in the two other groups ($p < .05$). These findings are discussed with regard to applied explanations and implications, and possible future research is suggested.

Keywords

coaching education, coaching efficacy, self-efficacy, educational sources, formal learning

SAMMENDRAG

Det er tidligere antydet at trenerutdanning har positiv effekt på situasjonsspesifikk mestringstro blant idrettstrenere. På tross av dette er det ikke undersøkt om tilnærming og læringsmetode i formell trenerutdanning har betydning for nivået av situasjonsspesifikk mestringstro. Hensikten med denne studien er derfor å undersøke hvorvidt situasjonsspesifikk mestringstro varierer mellom trenere med ulik utdanningsbakgrunn fra det formelle utdanningssystemet. Spesiell fokus rettes i den forbindelse mot de erfaringsbaserte og praksisrettede «Topptrener»-utdanningene. 614 norske trenere fra ulike idretter som langrenn, sykkel, friidrett, fotball og håndball deltok i en nettbasert spørreundersøkelse som hadde til hensikt å kartlegge mestringstro knyttet til trenernes unike arbeidssituasjon. Trenerne ble deretter delt i tre grupper, basert på deres formelle utdanningsbakgrunn: 1) trenere med «tradisjonell idrettsrelatert formell utdanning», 2) trenere «uten noen form for idrettsrelatert formell utdanning» og 3) trenere med «erfaringsbasert og praksisrettet formell utdanning fra Topptrener 1- og/eller 2-utdanningene. Når mulige kjønnsforskjeller ble tatt høyde for, og antall år med formell utdanning og praksiserfaring som trener ble brukt som kovariater, hadde trener med 'Topptrener'-utdanning signifikant høyere skår med situasjonsspesifikk mestringstro enn trenerne i de to andre gruppene ($p < ,05$). Disse funnene diskuteres i lys av tidligere forskning på området, og forslag til videre forskning lanseres med utgangspunkt i dette.

Nøkkelord

trenerutdanning, mestringstro, utdanningskilder, formell utdanning, idrett

INTRODUCTION

The focus on gaining a better understanding of how coaches in sport learn and develop their competence efficiently has increased over the last decade (Cushion et al., 2010). In this regard, one main area of discussion in scientific literature has been about the use of self-directed learning based on experience and reflection, commonly defined as informal learning (Nelson, Cushion, & Potrac, 2006); compared to institutionalized chronologically graded and hierarchically structured formal learning[1] (Nelson, Cushion, & Potrac, 2006) and organized non-formal educational activity carried on outside the framework (Cassidy & Rossi, 2006; Erickson, Bruner, MacDonald, & Côté, 2008; Lemyre, Trudel, & Durand-Bush, 2007; Stoszkowski & Collins, 2015; Wright, Trudel, & Culver, 2007).

Informal learning has been highlighted as the most preferred learning pathway for coaches (Cassidy, Jones, & Potrac, 2004; Cushion, Armour, & Jones, 2003; Cushion et al., 2010; Myhre, Løkke, & Moen, 2017; Stoszkowski & Collins, 2015). However, it is argued that formal learning has limitations, such as absence of scientific support, lack of feedback and innovation, and risk of conservative reproduction of knowledge and practice (Mallett, Trudel, Lyle, & Rynne, 2009). Formal and non-formal sources are, on the other hand, often criticized for taking a theoretical rather than a practical approach, indoctrinating coaches

1. In a Norwegian perspective, formal learning sources are previously defined by Myhre, Løkke and Moen (2017) as learning sources covered by «*Nasjonalt kvalifikasjonsrammeverk for livslang læring*» (Nasjonalt organ for kvalitet i utdanningen – NOKUT, 2014).

into a «correct» way of coaching, lacking a holistic approach, covering too much information in a short time, and having limited levels of individualization. Such theory–practice issues make these sources less appreciated by coaches (Abraham & Collins, 1998; Abraham, Collins, & Martindale, 2006; Gould, Gianni, Krane, & Hodge, 1990; Schempp, Webster, McCullick, Busch, & Mason, 2007; Stoszkowski & Collins, 2015; Wright et al., 2007).

Coaching practice is a craft that requires holistic knowledge from a number for fields (Myhre et al., 2017). In this regard, the coaching literature has assigned credibility to individual knowledge development through real-world practice and interaction with athletes and peers, with successive reflection (Cassidy, Potrac, & McKenzie, 2006; Gilbert, Gallimore, & Trudel, 2009; Mallett et al., 2009; Partington, & Cushion et al., 2010). This type of knowledge development might potentially take place in both formal, non-formal and informal learning situations. However, it has been suggested that the coaches' preferred use of informal learning sources might arise from coaches' negative experiences in formal and non-formal learning sources, rather than the actual effectiveness of learning informally in itself (Cushion et al., 2010). From the perspective of formal learning institutions, this substantiates the question raised by Stoszkowski and Collins (2015): «*Do we simply need to make formal learning more palatable and 'real-world' impactful, perhaps by drawing more effectively on social interaction and individual applied experiences during coach education courses?*»

COACHING EDUCATION AND COACH LEARNING

Education programs that systematically over time utilize critical consideration of individual, practical experiences in light of relevant research, have previously been described as beneficial for development of appropriate and reflective practice in practical professions (Josefson, 2015). Garmannslund and Alnes (1994), who suggested that task- and situation-specific competence is best developed in a learning environment that includes both social and academic challenges, also support this. In the coach education context, Myhre et al. (2017) proposed that formal coach education programs should be organized as specialized educational training programs which like, i.e. teacher education, account for all aspects of knowledge, skills and attitudes that coaches need in their practice. Considering previous coach education research (Cushion et al., 2010; Stoszkowski & Collins, 2015), education programs using the above-mentioned approach are likely to accommodate coaches' preferred way of learning, while also ensuring the quality of what is actually learned. Additionally, one avoids unfortunate reproduction of knowledge, which is not appropriate for the craft of coaching (Myhre et al., 2017).

Within the formal education system in Norway, the «Topptrener 1» and «Topptrener 2» education (each 60 credits, part-time in two years) are two educational programs for coaches that are somewhat distinct from other formal education programs. The «Topptrener 1» and «Topptrener 2» programs are planned and arranged in cooperation between a university (Norwegian School of Sport Sciences and Norwegian University of Science and Technology, representing the formal educational system) and the Norwegian Olympic Training Center (representing the field of practice in sport). Each of these programs gives 60 ECTS-credits, as part-time studies over two years. The main aim of the

Topptrener programs is to link relevant theory to coaches' own experiences, and to stimulate critical reflection on these experiences.[2,3] The teaching at the «Topptrener» programs alternates between lectures, group work and self-reflection. Students additionally do homework where they are challenged to link theoretical perspectives to their day-to-day experiences, and mentoring is used in this regard to support the practical approach. Further, knowledge sharing across sports is also an important part of the learning methods used in the program. Thus, the «Topptrener» programs correspond to the ideas of Josefson (2015), Garmannslund and Alnes (1994) and Myhre et al. (2017), and should positively affect coaches' operational competence. However, whether this is manifested in practice is unknown.

EFFECTIVE COACHING IN PRACTICE

No matter what learning sources coaches utilize, the primary output of coaches' knowledge should eventually be athlete development and performance (Côté, Bruner, Erickson, Strachan, & Fraser-Thomas, 2010). To what extent coaches believe in their ability to actually affect learning and performance of their athletes is commonly termed «coaching efficacy» (Feltz, Chase, Moritz, & Sullivan, 1999). The concept of self-efficacy has received considerable attention in various disciplines, probably because of the positive link between efficacy level and task performance (Moritz, Feltz, Fahbach, & Mack, 2000; Sandri & Robertson, 1993; Treasure, Monson, & Lox, 1996) and task persistence (Schunk, 1995). Interestingly, numerous studies have found level of coaching efficacy to have a direct impact on coaches' effectiveness and success; higher levels of coaching efficacy are likely to impact coaches' behaviour positively, with subsequent positive effects on learning and performance of their athletes (Feltz et al., 1999; Myers, Wolfe, & Feltz, 2005; Sullivan, Paquette, Holt, & Bloom, 2012; Sullivan & Kent, 2003; Vargas-Tonsing, Warners, & Feltz, 2003).

Coaching efficacy develops as a cognitive process, as coaches analyse and judge what tasks and actions are relevant in their role, and consider to what extent they are able to accomplish these tasks and actions (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Thus, the concept of coaching efficacy covers both cognitive and habitual aspects of the coaching role, as it relies on coaches' subjective perception of one's capabilities to execute actual, practical actions. A well-designed coaching education program, which is experience-based and practice-oriented, is expected to increase the level of coaching efficacy (Campbell & Sullivan, 2005; Feltz, Short, & Sullivan, 2008; Malete & Feltz, 2000; Sullivan et al., 2012). With this as a background, coaching efficacy is used as a theoretical framework to measure how coaches in this study accomplish their central tasks as coaches in their sport.

THE CURRENT STUDY

To our knowledge, no study to date has investigated possible differences in coaching effectiveness or coaching performance with respect to what type of formal education programs

2. http://www.nih.no/studere-pa-nih/deltidsstudier/topptrener-1/
3. https://www.ntnu.no/videre/topptrener-2

coaches have completed. This might be due to difficulty in comparing complex learning outcomes. In this study, we suggest an approach to this based on the concept of self-efficacy, inspired by Malete and Feltz (2000), and following the guidelines given by Bandura (1996).

Using this approach, the purpose of this study is to investigate possible differences in coaching efficacy related to the coaches' most important tasks, among Norwegian coaches who have completed the experiential Topptrener 1 and/or 2 educational program (hereinafter termed «*Topptrener coaches*»), compared to coaches who have only completed conventional sport-specific higher formal education (hereinafter termed «*conventionally educated coaches*»), and coaches who have no sport-specific higher formal education (hereinafter termed «*uneducated coaches*»). It is our intention that both the approach and the findings in this study are of interest and relevance to the field of coach education in sport, as well as to other professions.

METHOD

Participants and procedure

Nine hundred and eighty-four coaches recruited from coach databases held by the Norwegian Olympic and Paralympic Committee and Confederation of Sports and its sub-federations, were invited to voluntarily participate in an online questionnaire. The Norwegian Olympic and Paralympic Committee and Confederation of Sports and the respective sub-federations granted access to the coach databases, and contact information in terms of e-mail addresses was used. All coaches listed with a valid e-mail address were included in the study.

One week before the questionnaire was distributed, the coaches received information via email about the survey, including why they were selected to participate, the background and purpose of the study, the anonymity and confidentiality of their contribution, and the project approval given by the Norwegian Social Science Data Services (NSD).

Instrumentation and data processing

A questionnaire consisting of two parts was developed to measure the variables in this study. Part 1 aimed to cover the coaches' background and their coaching profession today. In this part of the questionnaire, coaches were asked to document their sex, age, type of education, years of experience as coaches, type of sports in which they coach, and coaching position.

Part 2 intended to measure the coaches' efficacy related to their specific role as a coach today. When constructing scales to assess self-efficacy, preliminary investigations are normally made through open-ended interviews and pilot questionnaires in order to identify actions, challenges and impediments associated with the situation in which efficacy is intended to be measured (Bandura, 2006). However, according to Bandura (2006), a «one measure fits all»-approach in self-efficacy investigations usually has limited explanatory and predictive value in heterogeneous groups, as most of the items in an all-purpose test may have little or no relevance to the domain of functioning of each individual. Coaches in

this study practiced at various levels in many different sports, and we therefore expect differences in what tasks that are relevant for each coach. Because of this, a standardized questionnaire was not regarded as sufficient to cover each coach's actual situation.

Therefore, the authors developed a semi open-ended questionnaire. The questionnaire intended to give coaches the opportunity to use their individual experience and reflections when defining the most important tasks in their unique situation, and thus construct items in their own situation specific efficacy scale. On page 1 in this part of the questionnaire, the coaches were asked to enter the five tasks and/or actions that they considered most central and important in their work to affect learning and performance of their athletes. This was done to make sure the items in the scales were linked to aspects that in fact determine quality of functioning in the domain of each individual coach (Bandura, 2006). After doing this, on page 2 of the questionnaire, they were asked to make a judgment of their capability on each of these tasks. Here they evaluated to what extent they felt sure of accomplishing each task effectively, on a scale ranging from 0 = «Not sure at all» to 10 = «Very sure». A total coaching efficacy score was calculated by summing the scores of each of the five tasks, and then dividing by five.

All statistical analysis was conducted using the SPSS software (version 21, IBM Corporation, 2012). The significance level was set at $p > .05$, and data are presented as mean ± standard deviation unless otherwise noted.

RESULTS

From the 984 coaches, 614 completed the questionnaire, which gives a response rate of 63.8 %. The coaches were from a wide range of sports, with handball, cross-country skiing, athletics, cycling, soccer and swimming being the most frequently reported sports. For the statistical analysis, coaches were split into three groups based on their formal educational background: «Topptrener coaches», «conventionally educated coaches» or «uneducated coaches». Demographic details of the complete sample and the sub-groups are presented in *Table 1*.

Table 1 Demographic details of the coaches participating in the study

		Gender										Role		Employment			Level of athletes		
	n	Female	Male	Age			Years of experience			Years of education*		Head coach	Assistant coach	Full-time	Part-time	Voluntary	Elite	Junior	Recreational
Total	614	108	506	28,3	±	11,1	14,5	±	9,6	6,1	1,8	431	183	132	168	314	91	246	277
«Topptrener coaches**	*169*	*30*	*139*	*27,1*	±	*8,6*	*15,9*	±	*8,1*	*6,6*	*1,4*	*117*	*52*	*76*	*44*	*49*	*45*	*99*	*25*
Conventionally educated coaches	*258*	*21*	*148*	*26,8*	±	*12,4*	*15,3*	±	*11,0*	*5,7*	*2,1*	*183*	*75*	*41*	*92*	*125*	*34*	*101*	*123*
Uneducated coaches	*187*	*29*	*140*	*30,8*	±	*10,9*	*12.6*	±	*8.2*	*6,3*	*1,6*	*131*	*56*	*15*	*32*	*140*	*12*	*46*	*129*

Note: * Years of education after primary school. ** Coaches in the «Topptrener coaches» group had completed the «Topptrener 1» and/or the «Topptrener 2» education within the last five years prior to the investigation.

With regard to coaching efficacy, the most commonly reported tasks, regardless of education level, were «planning training sessions», «planning training periods», «conducting training sessions», «supporting/communication with athletes», «technique guidance» and «support during competitions». Other commonly reported tasks were related to «team building» and «dialogue with parents and other devotees», and personal aspects (such as «being engaging/motivating», «being a role model», «selecting athletes for teams» or «acquiring more knowledge about my sport»).

For the complete sample, the total mean coaching efficacy score was 6.67±1.61. The average score for the group of «uneducated coaches» was 6.19±1.63, while for «conventionally educated coaches» the average score was 6.51±1.70, and for «Topptrener coaches» the average score was 7.44±1.05.

Preliminary analyses

Gender, education and years of coaching experience have earlier been found to influence efficacy levels among coaches (Feltz et al., 1999; Lee, Malete, & Feltz, 2002). Therefore, preliminary analyses were performed to determine whether there were any significant differences between groups on these variables.

When an independent sample *t*-test was used to compare task specific coaching efficacy means for males and females in each group respectively, no significant gender differences were found ($p > .05$).

We then investigated if there were significant differences among the three groups in years of education after primary school and years of coaching experience by using a one-way ANOVA. The variance analysis showed significant differences in years of education after primary school, $F(2, 611) = 15.92$, $p < .01$. Post hoc analysis with Bonferroni adjustment showed that «conventionally educated coaches» (*M* 5.7±2.1 had significantly less education after primary school than «Topptrener coaches» (*M* 6.6±1.4, *M* diff = –.94, 95% CI [–1.35, –.52], $p < .01$) and «uneducated coaches» (*M* 6.3±1.6, *M* diff = –.66, 95% CI [–1.07, –.25], $p < .01$). There were no significant differences between the «Topptrener coaches» and the «uneducated coaches».

The variance analysis also showed significant difference in years of coaching experience $F(2, 611) = 9.31$, $p < .01$. Post hoc analysis with Bonferroni adjustment showed that «uneducated coaches» (*M* 11.9±8.4) had significantly less coaching experience than «conventionally educated coaches» (*M* 15.3±11.0, *M* diff = –3.28, 95% CI [–5.48, –1.09], $p < .01$) and «Topptrener coaches» (*M* 15.9±8.1, *M* diff = –3.97, 95% CI [–6.40, –1.54], $p < .01$). There were no significant differences between the «Topptrener coaches» and the «conventionally educated coaches».

Because of the findings in the preliminary analysis, years of education after primary school and years of coaching experience were used as covariates in the subsequent tests.

Effects of coaching education on coaching efficacy

An ANCOVA was run to determine the effect of coaching education programs on task-specific coaching efficacy after controlling for years of education after primary school and years of coaching experience. Preliminary analysis evaluating the assumption of homogeneity-of-regression slopes indicated that the relationship between the covariate and the

dependent variable did not differ significantly as a function of the independent variable, $F(2, 547) = 1.252$, $p > .05$. Further, the assumptions of normal distribution, homoscedasticity and homogeneity of variances were met. The ANCOVA for coaching efficacy by years of education after primary school and years of experience showed significant results, $F(2, 549) = 59.98$, $p < .001$, $\omega^2 = .084$ (see *Table 2*).

Post hoc analysis with Bonferroni adjustment revealed that «Topptrener coaches» (adj *M* 7.42, SE .11) had significantly higher levels of coaching efficacy than «conventionally educated coaches» (adj *M* 6.50, SE .01, adj *M* diff .90, 95% CI for diff [–1.19, –.62.], $p < .001$, d=.61) and «uneducated coaches» (adj *M* 6.25, SE .13, adj *M* diff 1.17, 95% CI for diff [–1.51, –.83], $p < .001$, d=.80). No significant difference was found between «conventionally educated coaches» and «uneducated coaches» ($p > .05$).

<Insert Table 2 about here>

Table 2 Analysis of Co-Variance for coaching efficacy by years of education after primary school and years of coaching experience

Source	SS	Df	MS	F	p
Type of coaching education	122.96	2	61.48	27.72	***
Years of education after primary school	1.92	1	1.92	.86	.35
Years of coaching experience	78.05	1	78.05	35.19	***
Error	1350.76	609	2.22		
Total	28,915.12	614			

Note: *** $p < .001$.

DISCUSSION

The purpose of this study was to investigate possible differences in coaching efficacy among Norwegian coaches with «Topptrener 1 and/or 2» education, compared to «conventionally educated coaches» and «uneducated coaches». The main finding was that coaching efficacy significantly depended on the coaches' former education, with «Topptrener coaches» differentiating significantly from both «conventionally educated coaches» and «uneducated coaches». The investigation in this study was conducted using a custom-made efficacy scale. In accordance with Bandura (1996), such an approach is necessary in heterogeneous groups for efficacy items to be relevant to the domain of functioning for each individual.

One possible explanation for differences found in this study could be the years of experience as a coach, as level of coaching efficacy was formerly linked to years of experience (Chase, Feltz, Hayashi, & Hepler, 2005; Feltz et al., 1999; Lee et al., 2002; Malete & Feltz, 2000). Another possible explanation could have been the numbers of years of education, because levels of coaching efficacy are also linked to years of education (Chase et al., 2005). Although some group differences in years of experience and education were revealed, the ANCOVA analysis where both years of experience and years of education were entered as

covariates, showed that «Topptrener coaches» have significantly higher levels of coaching efficacy compared to both «conventionally educated coaches» and «uneducated coaches». Thus, other explanations are needed to explain the group differences found in this study.

The former explanations for group differences in coaching efficacy addressed above greatly rely on a quantitative «more-is-better-approach», also with regard to education. However, it is previously suggested that development of task- and situational specific competence also depends on the quality of the education. It is suggested that task- and situationally specific competence is best developed in a learning environment that includes both practical and academic challenges (Garmannslund & Alnes, 1994). While traditional, formal education and non-formal learning sources are previously criticized for not adequately considering individual experiences (Stoszkowski & Collins, 2015; Wright et al., 2007), the «Topptrener 1 and 2» educations are suitable examples of learning programs that deliberately include both the practical and the academic aspect. In the «Topptrener education», the coaches have their own experiences challenged both by other coaches' experiences and by academic theory, and through social interaction. Additionally, the «Topptrener 1 and 2» education also adds an extra dimension to the social aspect, as coaches share and discuss experiences across sports, where the reflections of each participant are mirrored against subjective viewpoints from other coaches. Through these approaches, the social facet of the learning is ensured. Additionally, in the «Topptrener 1 and 2» programs, coaches' individual reflections are mirrored against academic theories through customized assignments and discussions where professionals take part. The disparagement of a «more-is-better-approach» is also of relevance for other fields of education of practitioners.

A possible explanation for the results in this study is that the individual and practical approach to the learning process that characterizes the «Topptrener programs» approach constitutes a difference in the learning process. Interestingly, Butler (2005) noted that the learning approach called Teaching Games for Understanding offers a way for practitioners to challenge their practice, move from a 'comfort zone', and open themselves up to self-reflection. Teaching Games for Understanding has been utilized with, i.e. teachers, to challenge established practices and beliefs (Butler, 1996). It has also been shown to challenge entrenched cultures within physical education teacher education programmes (Butler, 2005; Howarth, 2005; Light & Butler, 2005). Although not directly based on the principles of Teaching Games for Understanding, the Topptrener programs contributes to challenging the coaches' practice through reflection, and further adapts their practice based on this, supported by mentoring. When discussed with other coaches and linked to relevant theory by support of academic staff, compared perspectives might be brought forth. Thus, tasks that the coaches bring into the learning process will then have the potential to be examined and analysed both more broadly and deeper, and improvement potential or alternative solutions might be identified. This should be a clear improvement as compared to the theoretical approach based on lectures and generalized assignments, for which conventional formal coach education is previously criticized (Mallett, Trudel, Lyle, & Rynne, 2009). Self-efficacy is a construct that is closely related to habitual and bodily experiences (Bandura, 1997). Thus, by reflecting on experiences related to specifically to their role, coaches are given the opportunity to gain a deeper understanding of how to accomplish similar tasks in

the future. When implementing this into their own practice, coaches are likely to experience improvements among their athletes as a result of the changes made.

According to Bandura (1995) self-efficacy is the «*belief in one's capabilities to organize and execute the courses of action required to manage prospective situations*». Thus, coaching efficacy is both task- and situation-specific, meaning that it represents the coaches' cognitive judgments about how well they can execute practical tasks in their roles. An education program that over time systematically utilizes reflections based on individual, practical experiences in light of relevant research and theory is more likely to expand coaches' abilities to think critically. This means that they get better at actively analysing, evaluating and applying information they get from experience in a purposeful, reasoned, and goal-directed way (Halpern, 1999; Paul, 1993). Thus, coaches develop a combination of both practical and theoretical understanding of the most efficient way to coach, meaning that they acquire valuable knowledge and skills, and a sense of appraisal for what they implement and not in their practice. Our results therefore indicate that coaches who have completed the «Topptrener education» have developed a more efficient competence to manage their roles as coaches. Research indicates that raised coaching efficacy will influence the way coaches act with their athletes, which further will be beneficial for their athletes' performances (Martens, 1990; Vargas-Tonsing et al., 2003). In turn, athletes' performances are linked to higher levels of coaching efficacy (Bandura, 1986; Chase, Feltz, Hayashi, & Hepler, 2005; Feltz et al., 1999). This means that a well-designed education program could ultimately cause a self-reinforcing mechanism between coaching behaviour and coaching efficacy. Such a mechanism could also be expected in professions, such as in teaching of students.

Criticism against informal learning includes the risk of conservative reproduction of knowledge. This means, that even if one specific technique or behaviour is used by an apparently «successful» coach, it is not necessarily appropriate or effective for another coach, nor does it necessarily represent the most up-to-date, state-of-the-art practice (Abraham & Collins, 2011; Stoszkowski & Collins, 2015). As mentioned, the development of efficacy is a cognitive process, where coaches analyse and judge their ability to plan and execute actions needed to accomplish important tasks in their specific role and situation (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). When individual experience is used as the basis of the learning process, coaches directly reflect upon tasks that are relevant in their practice, and further develop their practice based on this. For optimal development of both coaches' individual practice and sports coaching as a profession, the findings of this study suggest that an individual, experience-based approach to coach education might be essential.

The features of a cross-sectional design limit the present study. Future studies examining the effects of various approaches in coaching education on coaching efficacy should therefore include pre- and post-test investigations. It is worth noting that coaches' perceived efficacy is also influenced by past performance and perceived ability of their athletes, and perceived social support, none of which is covered in this study. Possible effects of non-formal learning sources are not considered in this study. Further, it is noted that one of the authors has long experience with formal and non-formal coaching education, including the Topptrener programs, which should be taken into account when considering the result and discussion.

Still, the findings in this study substantiate Stoszkowski and Collins' (2015) suggestion that formal learning for coaches might benefit from drawing on social interaction and individually applied experiences. This is undergirded by the links between coaches initially preferring to learn in a social context, the benefit of learning from own experiences, and the characteristics of the «Topptrener 1 and 2» education programs. One possible way for coaching education programs to effectuate this might be to apply a holistic approach to the competence required by coaches, and link theoretical knowledge to coaches' own experiences. This should also be highly relevant for other professions outside the field of sport that rely on teaching, counselling and coaching.

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