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ORIGINAL ARTICLE

Investigating the perceptions of self-efficacy of in-field and out-of-field home economics teachers

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Abstract

Out-of-field teaching is a strategy employed to address global teacher shortages. This study compares Australian in-field and out-of-field teacher effectiveness perceptions when teaching home economics. An online survey ($N = 194$) identified statistically significant findings that negatively impact the subject, teachers, and students: in-field teachers report they are more effective than out-of-field teachers, while out-of-field teachers claim they are equally effective; in-field and out-of-field teachers report declines in self-efficacy and well-being when teaching out-of-field; out-of-field teachers use narrower subject skills, safety, and knowledge. Professional learning, skill development, resource provision, support/mentoring, planning time, and strategic hiring are suggested to address out-of-field teaching challenges.

KEYWORDS

home economics, out-of-field teaching, pedagogical content knowledge, self-efficacy, teacher well-being, teacher workforce, teaching skill development

INTRODUCTION

There is a global teacher shortage, and teaching out-of-field (OOF) is a strategy to address inadequate supply. However, a growing corpus of research points to negative impacts on teacher identity, job satisfaction and retention, teacher self-efficacy, and student learning outcomes when this strategy is employed. Nevertheless, out-of-field teaching (OOFT) practices are a common feature of the Australian teacher workforce, with 1 in 4 teachers engaged in OOFT.

Teaching effectiveness develops through teaching quality and teacher capabilities (Australian Institute for Teaching and School Leadership [AITSL], 2017). In December 2022, the Federal Department of Education (Australia) released the National Teacher Workforce Action Plan (NTWAP) (Department of Education, 2022), declaring that Australia has "a teacher shortage right across the country" (p. 3) and "everything that teachers do, and that is done to support them … [is] linked to increasing the positive impact of teaching on students" (AITSL, 2017, p. 1). Despite identifying five priority areas encompassing 27 actions, out-of-field (OOF) teaching was not identified as an area for action. The NTWAP was developed in response to the Australian Government Quality Initial Teacher Education Review (Review) (Australian Government, 2022), which provided 17 recommendations to address teacher shortages. The review noted that OOFT is a strategy employed to manage the inadequate supply of teachers, especially those in specific teaching areas, and:

> [E]nsuring an adequate supply of teachers is a key concern for teacher employers and other education stakeholders. … Often, schools employ teachers to teach out-of-field to fill vacancies
>
> (Australian Government, 2022, p.78).

OOFT as a panacea for teacher shortages

The Australian Teacher Workforce Data (ATWD) is a joint initiative of state, territory, and Commonwealth governments with data obtained through an annual survey of teachers, with more than 30,000 responses providing a robust dataset providing timely insights into the workforce. The ATWD defines OOFT as the alternative to in-field teaching, where teachers are "teaching subject areas in which they have been trained to teach. That training ordinarily takes the form of tertiary education in both subject-specific content and pedagogy" (AITSL, 2021, p. 88). Data from the ATWD reveals that OOFT is common practice, especially in the secondary years, "with at least one-in-four classroom teachers [who] taught subjects in a Key Learning Area out-of-field" (AITSL, 2023, p. 7). In the Technology Key Learning Area (KLA), which is of interest to this study as this is where home economics is commonly delivered, 44% of the teachers are OOF (AITSL, 2023). This means the delivery of technology education in Australia depends upon non-expert teachers in almost half the classrooms nationally, and the reliance on OOFT as a panacea for inadequate supplies of teachers has become one of the defining characteristics of the Australian teacher workforce, not only for home economics teachers but across many subject areas. Home economics teacher shortages have been predicted in Australia for more than two decades (Pendergast et al., 2000, 2020), aligning with concerns around the globe, including in America (Duncan et al., 2017).

Effective teaching and the role of subject knowledge–what, why, and how

In defining in-field teaching as requiring subject-specific content and pedagogy, the ATWD acknowledges the importance of a deep understanding of subject knowledge to teach effectively. Importantly, subject-specific content and knowledge relevant for teaching school subjects begins with engagement with academic disciplines. In educational settings, Deng (2020) asserts that during induction into an academic discipline, such as initial teacher training (ITE), teachers develop an understanding of the academic discipline rather than the content of a school subject, providing a broader understanding of the field. The academic discipline teaches the *why*, and the school subject is the *what* packaged in a condensed and manipulated

form of the academic discipline (Deng, 2020). It is, therefore, helpful for teachers to understand an academic discipline's specialized body of knowledge and acquire school-subject-specific knowledge so they can understand the *what* and *why* of subjects. This is akin to the national standards for teachers in the USA (Handy et al., 2021). This deep understanding is more likely to be lacking in OOF teaching situations where there is a focus on the *what*-the curriculum to be delivered.

In addition to the *what* and *why*, the *how* of subject delivery is necessary for achieving optimal student learning outcomes. Shulman (1986) provided educators with a classification of knowledge types, highlighting teacher expertise as holding both academic and pedagogical content knowledge (PCK). Shulman (1986) explains PCK as an understanding of the content knowledge of a discipline from syntactic and substantive perspectives alongside the pedagogical approach required to teach the content knowledge effectively by making it comprehensible, easily accessible, and interesting to a diverse array of students at varied levels of education–the *how*. The OOFT phenomenon typically exists without the development of specialized PCK (Du Plessis et al., 2015), with implications for teacher identity and satisfaction (Riordain et al., 2022), including teacher self-efficacy (Castro et al., 2023) and student learning (Overschelde, 2022) due to a lack of the *what*, *why*, and the *how*. We argue that attentively developed skills and applied knowledge are strongly embedded into the careful guidance of deep learning by a teacher with expert pedagogical insight.

Teacher identity

In her theoretical model of teacher identity and satisfaction and how this applies in the context of OOFT, Hobbs (2013) argued that OOF teachers continuously negotiate a boundary between their in-field and OOFT experiences, with three factors impacting individual teachers: context, support mechanisms, and personal resources (Hobbs, 2013). The variations in these contextual factors impact teacher identity, job satisfaction, and effectiveness, which is an area of focus in this study. Riordain et al. (2022) employed Hobbs' theoretical model to examine the development of OOF mathematics teachers' professional self-understanding, revealing a negative impact on teachers' sense of professional self. This was often coupled with professional isolation along with experiences of feelings of stress, anxiety, and inadequacy because of their perceived lack of content and PCK.

Teacher self-efficacy

Concerning the impact of OOFT on teacher effectiveness, one way of considering teacher effectiveness is via the notion of self-efficacy. This was first conceived by Bandura and is defined as "beliefs in one's capabilities to organize and execute the course of action required to produce given attainments" (Bandura, 1977, p. 3). Many studies focus on teacher self-efficacy, which is the belief held by individual teachers about their ability to perform certain teaching tasks. Self-efficacy is an important motivational construct that shapes teacher effectiveness in the classroom, relating to a specific task or situation (Pendergast, O'Brien, et al., 2022). As noted by Pendergast et al. (2022, p. 368), "[T]eachers with a high level of teacher self-efficacy have been shown to be more resilient in their teaching and more likely to try harder to help all students to reach their potential. In contrast, teachers with a low level of teacher self-efficacy have been found to be less likely to try harder to reach the learning needs of all their students." Unsurprisingly, there is compelling evidence of the positive relationship between teacher self-efficacy and student achievement (Alibakhshi et al., 2020). What is relatively unexplored is the relationship between OOF teachers' self-efficacy beliefs (Goos & Guerin, 2022).

Teacher self-efficacy is multi-faceted and comprises the key components of confidence (having a belief in oneself) and competence (having the PCK expertise). It strongly influences teachers' overall teaching effectiveness and motivation (Bandura et al., 1997; Hoy, 2000). A combination of high confidence and competence is required for effective teaching and learning. Hence, it is deeply rooted in developing expertise, especially PCK (Hoy, 2000). Self-efficacy can be enhanced through study specific to a field and by teaching experience in a field. OOF teachers lack (to varying degrees) both deep knowledge and experience, and the impact is reduced confidence and competence in their ability to teach students (Castro et al., 2023), leading to lowered self-efficacy, with the flow-on effect of reduced student achievement.

When efficacy is considered at a collective level, the impact of OOFT is potentially more profound. As noted earlier in this paper, one in four teachers teaches OOF in Australia. Hence, students consistently experience classes where teachers are likely to have reduced self-efficacy. The compounding effect on collective teacher efficacy magnifies the impact on learning achievement. Collective efficacy is the combined efforts of the teaching team. Hattie (2018) notes that one of the most influential factors affecting student achievement is collective teacher efficacy, that is, their belief in working effectively as a team. Hence, the problem of OOFT is not restricted to a singular subject experience but rather the compounding impact across several subjects across many years.

Student learning outcomes

These factors (subject knowledge, teacher identity, and self-efficacy) point to a challenging educational environment. In the context of teacher shortages, leading to increased instances of OOFT, are the impacts on student learning outcomes. The impact of OOFT on student learning is becoming better understood as large-scale studies present data about student performance, comparing those taught in the field with those by OOF teachers. For example, research by Overschelde (2022, p. 49) with 5 million students studying mathematics in an American state led to this clear finding: "[T]he results are unequivocal: students earn significantly and substantially lower exam scores when taught [OOF] compared to peers taught in-field. Students taught [by OOF teachers] are experiencing "value lost," not "value add," relative to their peers taught in-field." Along with the negative impacts on student learning, teacher effectiveness and retention are increasingly understood to be challenging for those teaching OOF and undoubtedly contribute to the precarious sustainability of the Australian workforce.

The study aim

In addition to the 'specific areas' noted by the Australian Government (2022) with teacher shortages and subsequent OOFT, many Design and Technology KLA (ACARA, n.d.) subjects are experiencing teacher workforce shortages. This study explored OOFT in the specific PCK case of the Australian secondary school Home Economics (HEc) subject. This area has not received specific attention in published datasets but remains an area of teaching in Australian schools. This study set out to compare in-field and OOF HEc teachers' beliefs on the effectiveness of teaching and student learning of OOF teaching. The findings are expected to add a greater understanding of the effects on the teaching of HEc and subsequent student learning when OOFTs deliver subjects compared to in-field teachers. Findings will be applied to the wider education sector, and implications will be considered.

METHODOLOGY AND METHODS

Methodology

This study implemented a convergent mixed methods design (Creswell & Plano-Clark, 2018), with qualitative and quantitative data obtained through an online survey instrument. The survey was globally disseminated and collected multifaceted data regarding OOFT in HEc (see Figure 1), with the global outcomes reported by Pendergast, Deagon, et al. (2022). This study reports on the Australian respondents' perspectives regarding effectiveness when teaching in-field and OOF in HEc. Ethics approval was granted by the Griffith University Human Research Ethics Committee (GU ref. no: 2022/050).

The survey instrument

The survey (see Figure 1) was informed by a systematic quantitative literature review (see Pendergast, McManus, et al., 2022) and was administered online for two weeks through Qualtrics during March 2022. Quantitative data were obtained for demographic questions and Likert scale responses ranging between one and six, where 1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = somewhat agree, 5 = agree, and 6 = strongly agree. Qualitative data were obtained through short response questions. The questions pertaining to demographics and effectiveness when teaching OOF are reported in the results section (see Figure 1).

Participants

The respondents were recruited through HEc social media services (Twitter, LinkedIn, and Facebook) or direct email invitations. Both avenues provided a direct link to the survey and permitted snowball sampling by sharing the survey link. Responses to the global survey were received from 14 countries and 469 respondents, with 194 Australian respondents of interest to this study.

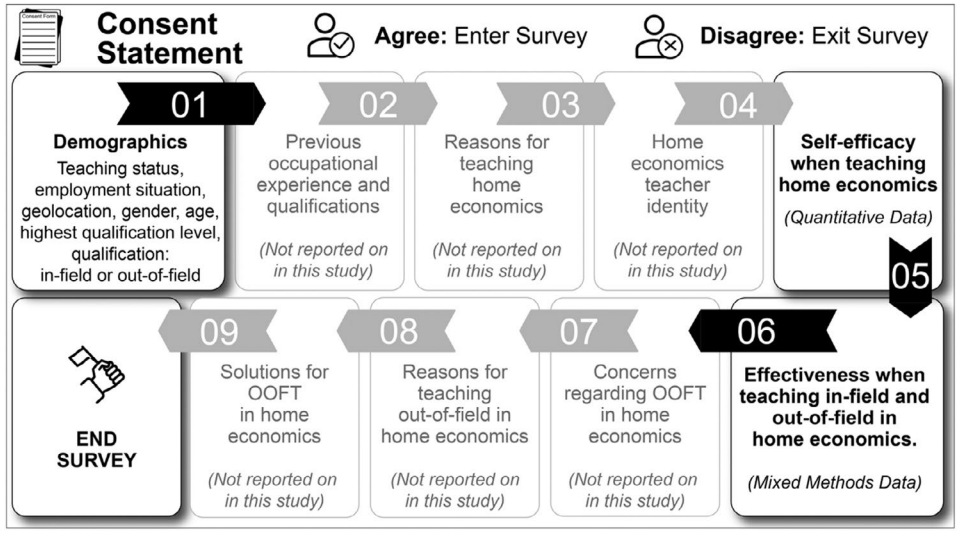


FIGURE 1 Survey structure.

Data analysis

Responses were extracted from Qualtrics in an Excel spreadsheet. Data were assessed for completeness and accuracy, and responses reported in this study were extracted. Data were screened for completeness, cleaned, and coded. Respondents were allocated an identification number from 1 to 194 and coded as either an in-field (IF) or OOF HEc teacher. Due to this study's convergent mixed methods design (Creswell & Plano-Clark, 2018), the qualitative and quantitative data were first analyzed separately, followed by the integration of the results.

Quantitative data

The study demographics were determined using Microsoft Excel. IBM SPSS version 29.0.0.0 was employed to conduct independent *t*-tests to compare the mean scores of in-field and OOF teacher Likert scale survey responses to explore statistically significant differences between these groups. A paired samples *t*-test was conducted to explore differences in in-field teachers' perspectives of self-efficacy when teaching in-field and OOF (Pallant, 2020). A Levene's test for equality of variances accompanied each *t*-test, and the significance was set to $p < 0.05$. Cohen's *d* was recorded to indicate the magnitude of the effect (Lakens, 2013). The effect size was interpreted using Cohen's (1988) benchmarks of small ($d = 0.2$), medium ($d = 0.4$), or large ($d = 0.8$) effect due to the lack of comparable research in this field (Lakens, 2013).

Qualitative data

The qualitative data generated through responses to the free text question "Do you have something you wish to add about effectiveness when teaching in areas of qualification compared to teaching in subjects where you are not qualified?" were analyzed using Leximancer v.4.51.07. The responses, alongside their coding, were uploaded to Leximancer using a .csv file, and the software was configured to explore variations in responses between in-field and OOF HEc teachers. The analysis was inductive (Braun & Clarke, 2006) to identify nuances specific to OOFT in HEc subjects.

Leximancer analyzes text through the quantification of frequently appearing terms and their co-occurrence. This content and relational analysis identifies the most frequently appearing words as "concepts" and groups them into overarching *themes* according to their co-occurrence patterns. This information is organized into a concept map that illustrates the relationships between the "concepts" and *themes* (Leximancer, 2021).

Within the concept map, "concepts" are written in lowercase black text and are associated with a gray circle. A larger circle indicates a high frequency of appearance of the "concept" within the text, and a smaller circle indicates a lower frequency. "Concept" relationships can be traced through the linking gray lines. "Concepts" can be linked to multiple *themes* and other "concepts;" however, they settle adjacent to the "concepts" they most frequently co-occur with.

The *themes* and their embedded "concepts" appear in large circles with titles in capitalized, bold text. Based on the frequency of appearance, dark gray highlights the most dominant theme, followed by lighter gray circles, with the lightest having the lowest frequency (Leximancer, 2021). The identified *themes* will be highlighted in the results of this study in italicized text, and the "concepts" in single quotation marks.

The text was analyzed using the dependent variable of HEc qualification to determine the status as an in-field or OOF HEc teacher. These variables are evident through the tags *In_field-respondents* or *Out_of_field_respondents*, which have settled in the concept map adjacent

to the "concepts" and *themes* they are primarily associated with based on the frequency of co-occurrence (Leximancer, 2021).

Following Leximancer analysis, the data were transformed from qualitative to quantitative (Creswell & Plano-Clark, 2018) and interpreted using Microsoft Excel. The respondent coding (identification number and HEc qualification) and free text answers were inserted into an Excel spreadsheet alongside the Leximancer-identified *themes*. The participant responses were interpreted alongside the *themes*, which inductively generated sub-themes and frequencies. These results were cross-referenced with the participant's HEc qualification, and relevant quotes were extracted to evidence the results.

Data integration

The results were integrated (Creswell & Plano-Clark, 2018) by matching the quantitative survey result with the corresponding theme identified during qualitative analysis. This interpretive phase enabled quantitative and qualitative data triangulation (Braun & Clarke, 2006) by comparing the results alongside contextualizing statistics with personal perspectives and experience reports.

RESULTS

The survey responses related to the effectiveness of OOF HEc teachers are presented by integrating the statistical data and the thematic content analysis of qualitative data. Participant quotes complement the results as evidence of the emergent themes.

Demographics

The survey yielded 194 respondents, of which 96% ($n = 186$) were female. The respondents were predominantly 40 years of age or more (73%), permanently employed in education ($n = 166$, 85%), and had completed a Bachelor's Degree ($n = 139$, 72%). The majority ($n = 161$, 83%) were in-field HEc teachers, with 66% ($n = 133$) predominantly teaching HEc subjects at the time of the study. Experienced HEc teachers formed the majority of respondents, with 63% teaching the subject for 11 years or more (see Figure 2). For the purposes of this study, in-field HEc teachers are defined as those with a HEc qualification.

Effectiveness of teaching home economics

Respondents were asked to indicate on a 6-point Likert scale the extent to which they agreed or disagreed that in-field HEc teachers are more effective at delivering specific disciplinary aspects of the HEc curriculum compared to OOF teachers. An independent samples *t*-test was conducted to compare the mean responses between in-field ($n = 157$, 83%) and OOF ($n = 33$, 17%) respondents, with significant differences ($p < 0.05$, two-tailed) identified for all disciplinary aspects. The effect size ranged between 0.42 (medium effect) and 1.45 (large effect), with the majority having an effect size of 0.75 or more (see Table 1).

The effect size was most significant for the disciplinary aspects of cooking, general HEc, textiles, early childhood education, financial literacy, and design. The remaining disciplinary aspects of technologies and equipment, hospitality, food literacy, health and wellbeing, sustainability literacy, and consumer education yielded a medium difference between means.

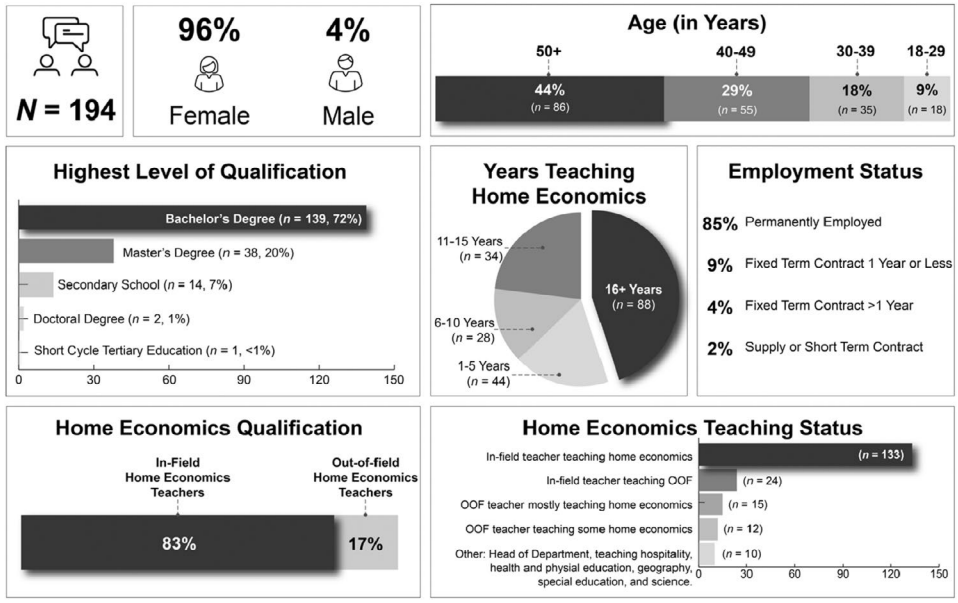


FIGURE 2 Respondent demographics.

These effect sizes indicate that being in-field or OOF has a statistically significant effect ranging from medium to large regarding HEc teachers' perceptions of their effectiveness and that of others when in or OOF.

In-field teachers perceive their effectiveness to be higher when teaching the listed disciplinary aspects of HEc compared to OOF teachers. Their mean ratings ranged between 4.1 and 5.5, reflecting their responses between agree and strongly agree on the Likert scale. Conversely, OOF teachers did not agree to the same extent that in-field teachers were more effective at teaching the disciplinary aspects, as their mean ratings ranged between 3.1 and 4.3, positioning their responses between somewhat disagree, somewhat agree, and agree. In comparing the responses of in-field and OOF teachers regarding their perceptions of the effectiveness of teaching HEc disciplines, in-field teachers report that in-field teachers are more effective, and OOFTs report that they do not agree or disagree that in-field teachers are more effective than OOFTs.

Participants were invited to provide free text responses to the question, "Do you have something you wish to add about effectiveness when teaching in areas of qualification compared to teaching in subjects where you are not qualified?" There were 103 comments primarily from in-field respondents ($n=90$; 87%), with 13% ($n=13$) OOF respondents. The data were analyzed using Leximancer, with four themes generated: *teachers* ($n=93$, 93%), *HEc experience, passion and support* ($n=53$, 53%), *skills* ($n=44$, 44%), and *depth of knowledge* ($n=32$, 32%) (see Figure 3a). These themes will now be explored, and quantitative findings will be aligned where relevant. The quotes evidencing each theme are located in Appendix A.

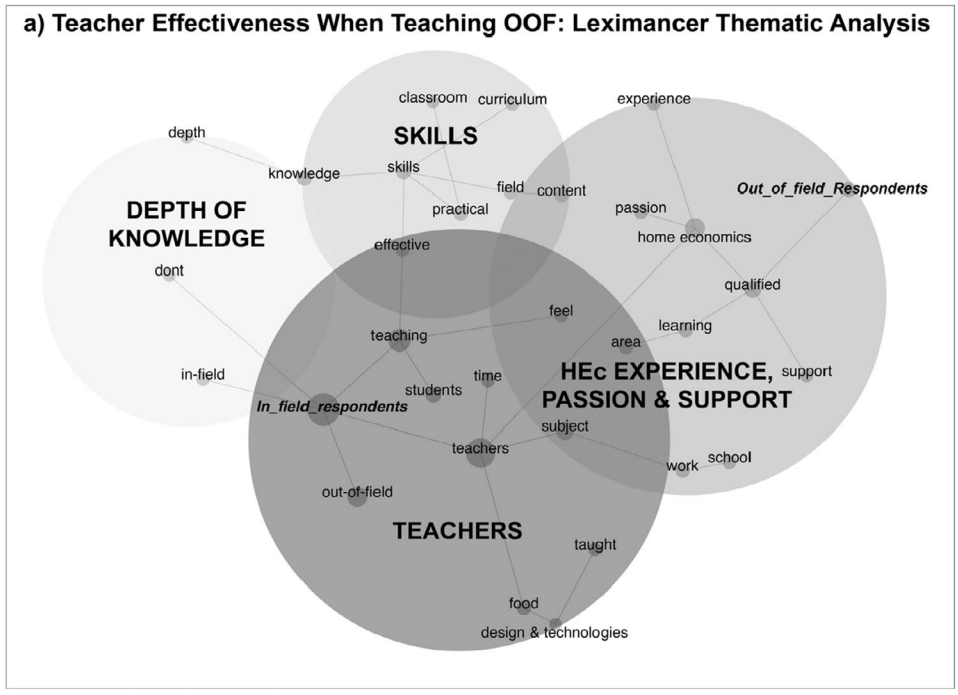
Theme 1: Teachers

The theme of *teachers* was discussed by 93% ($n=93$) of respondents and intersected with the other three themes. The subthemes within *teachers* are 'efficacy,' 'student impacts,' and 'time' (see Figure 3a,b).

TABLE 1 Independent samples *T*-test summary of respondent perspectives of in-field vs. OOF teacher effectiveness for HEc disciplinary aspects.

	In-field HEc respondents ($n = 157$)		OOF HEc respondents ($n = 33$)					
HEc disciplinary aspects	**M**	**SD**	**M**	**SD**	***df***	***t***	***p***	**Cohen's *d***
Cooking	5.4	1.09	3.7	1.35	188	7.6	<0.001	1.45
Home economics[a]	5.5	1.06	3.9	1.62	37.9	5.4	<0.001	1.34
Textiles[a]	5.3	1.19	3.8	1.81	38	4.4	<0.001	1.10
Early childhood education	4.7	1.19	3.6	1.41	188	4.6	<0.001	0.88
Design	4.4	1.33	3.2	1.47	188	4.5	<0.001	0.85
Financial literacy[a]	5.2	1.23	4.1	1.76	38.7	3.4	0.002	0.82
Technologies and equipment[a]	4.6	1.20	3.6	1.56	40.4	3.3	0.002	0.75
Hospitality	4.2	1.29	3.3	1.53	188	3.4	<0.001	0.66
Food literacy	4.1	1.27	3.3	1.47	188	3.4	<0.001	0.64
Health and well-being[a]	5.1	1.32	4.3	1.72	40.2	2.6	0.012	0.60
Sustainability literacy	3.8	1.23	3.1	1.46	188	3.0	0.003	0.58
Consumer education	4.4	1.46	3.7	1.70	188	2.2	0.029	0.42

[a]Assuming unequal variances.



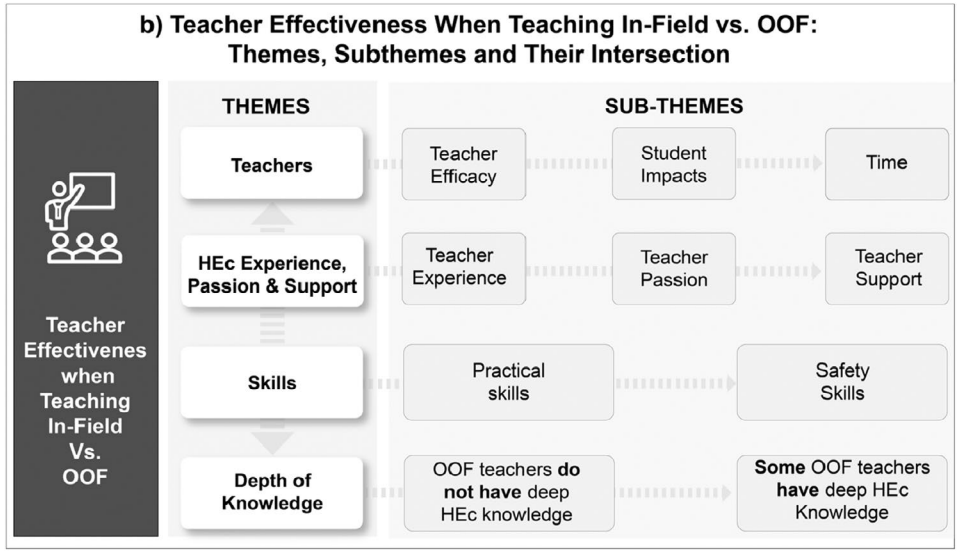


FIGURE 3 Leximancer analysis: effectiveness when teaching in-field compared to teaching OOF.

Subtheme 1: Efficacy

'Efficacy' when 'teaching' the 'subject' 'area' was discussed by 36% ($n = 37$) of respondents who were predominantly in-field teachers. In-field teachers reported changes to their self-efficacy regarding feeling out of their depth, overwhelmed, lacking confidence, and over-challenged. They also reported they found it hard to understand the lesson 'content' and 'felt' inexperienced. The lived experience of one 'in-field' respondent reported that teaching 'OOF' changes the way that they teach: 'I teach differently [OOF] – I don't demo/model as much as I am not as confident in what I am doing' (35, IF). These responses indicate a negative impact on 'effectiveness' when 'teaching' 'OOF' (see Table A1a).

'In-field' *teachers* also indicated that when 'teaching' 'HEc,' they experienced less stress and anxiety while feeling skilled, confident, competent, happy, and prepared. This made them more 'effective' *teachers* with improved self-efficacy. They reported that this enables the delivery of quality education and 'effective' 'classroom' management while enhancing student engagement (see Table A1a).

How working alongside 'OOF' *teachers* impacts the 'effectiveness' of 'in-field' *teachers* and how it makes them 'feel' was also reported. 'In-field' respondents reported experiencing frustration, difficulty, and exhaustion, which influences their 'classroom' 'effectiveness' (see Table A1a). The lived experience of an 'in-field' teacher illustrates these reports.

> After working alongside [OOF teachers in HEc] for 3 years, I can tell you that it is very exhausting having to teach a new [OOF] teacher every year. It has taken a toll on my own personal performance and passion … teachers I have worked with generally don't stay for more than 6 months to a year… They don't enjoy it and find it stressful
>
> (21, IF).

'OOF' *teacher* perspectives of how 'OOF' 'teaching' can impact 'effectiveness' and make them 'feel' mirrored 'in-field' *teachers* report. These respondents indicated that 'teaching' 'OOF' impacted their well-being and had them questioning their ability to reach the 'effectiveness' of an 'in-field' *teacher*. One respondent indicated that their 'OOF' colleague hated 'teaching' 'HEc,' which was reflected in their 'classroom effectiveness' (see Table A1a).

Although 5% ($n=5$) of in-field respondents reported that they believe only 'in-field' 'HEc' *teachers* are 'effective' at 'teaching' the subject, 9% ($n=9$, $n=8$ in-field) reported that the 'effectiveness' of 'OOF' 'HEc' *teachers* was individually dependent. These reports indicated that some 'OOF' *teachers* have the skills, knowledge, and interest required to be 'effective' 'HEc' teachers. It was also reported that quality inductions and support can impact 'OOF' *teacher* 'effectiveness', as does the 'OOF' teachers' commitment to 'HEc' (see Table A1a).

Participants were asked about their confidence, competence, and sense of belonging as a proxy for self-efficacy when teaching HEc and other subjects. Respondents (in-field: $n=161$, 83%; OOF: $n=33$, 17%) reported on a Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree) to respond to their sense of efficacy when teaching HEc and other subjects.

Multiple independent samples *t*-tests were conducted to compare the mean scores between in-field and OOF HEc teachers. Statistically significant differences between in-field and OOF teachers were evident in the mean ratings for feeling confident, competent, and belonging when teaching HEc. In-field teachers had a higher mean rating for confidence, competence, and belonging, indicating that they felt more confident and competent and belonged when teaching HEc compared to OOF teachers. The medium to large effect sizes indicated that qualifications did impact self-efficacy perceptions when teaching in-field and OOF in HEc (see Table 2).

A statistically significant difference between in-field and OOF teachers was identified in the mean ratings for feeling confident, competent, and belonging when teaching OOF from HEc. A medium effect size was observed for feeling confident and belonging when teaching OOF from HEc, and feeling competent observed a large effect size (see Table 2). These results indicate that in-field teachers had a lower mean rating for feeling confident, competent, and belonging when teaching outside of HEc compared to OOF teachers; therefore, in-field teachers do not perceive their self-efficacy to be as high as OOF teachers when required to teach OOF.

To examine these results further, a paired samples *t*-test was conducted to compare the means of in-field teacher ratings of competence, confidence, and belonging when they teach in-field and OOF from HEc (see Table 3). A statistically significant decrease in in-field teacher confidence, competence, and belonging was identified when teaching outside HEc, with a

TABLE 2 Self-reported confidence, competence, and belonging when teaching HEc.

	In-field HEc respondents ($n = 161$)		OOF HEc respondents ($n = 33$)					
Survey statement	**M**	**SD**	**M**	**SD**	***df***	***t***	***p***	**Cohen's *d***
I feel confident when I teach home economics[a]	5.7	0.68	4.7	1.08	37.5	5.2	<0.001	1.33
I feel competent when I teach home economics[a]	5.7	0.78	4.7	1.05	39.5	5.2	<0.001	1.20
I feel confident when I teach OOF	3.3	1.29	4.1	1.23	192	−3.4	0.001	−0.64
I feel competent when I teach OOF	3.2	1.32	4.2	1.35	192	−4.3	<0.001	−0.82
I have a sense of belonging when I teach in-field	5.6	0.97	4.9	1.03	192	3.8	<0.001	0.73
I have a sense of belonging when I teach OOF	3.0	1.35	3.9	1.19	192	−3.7	<0.001	−0.71

[a]Assuming unequal variances.

TABLE 3 Paired samples *T*-test of in-field teacher self-reported confidence, competence, and belonging when teaching outside of HEc ($N = 161$, $df = 160$).

	When teaching HEc		When teaching OOF					
Survey statement	**M**	**SD**	**M**	**SD**	***MD***	***t***	***p***	**Cohen's *d***
Teaching confidence	5.7	0.68	3.3	1.29	2.4	20.6	<0.001	1.62
Teaching competence	5.7	0.78	3.2	1.32	2.5	20.6	<0.001	1.63
Sense of belonging	5.6	0.97	3.0	1.35	2.6	18.6	<0.001	1.47

large effect size for all three self-efficacy aspects. This indicates that teaching outside HEc has a large negative effect on the self-efficacy of in-field HEc teachers.

Subtheme 2: Student impacts

The *teacher* 'student impacts' subtheme was evident in 18% ($n = 19$) of respondent comments, predominantly from 'in-field' *teacher* perspectives. This sub-theme intersected with the themes of *skills* and *depth of knowledge*, which will be discussed more in-depth within these sections. 'In-field' *teachers* reported that 'students' were more likely to learn from an 'effective' 'in-field' *teacher* as they enjoy learning more and develop a deeper understanding of 'HEc' content. They also reported that 'in-field' teachers hold higher 'student' expectations and can extend students when required (see Table A1b). These responses were reflected through the lived experience described by an in-field teacher who teaches OOF.

> I simply load the content (someone else has written) on the school learning platform, tell the students I have no idea or understanding of the subject, and they will

> have to teach each other…The kids mostly don't care, but I see the faces of those who wish the teacher knew what they were doing
>
> (24, IF).

The notion of 'students' being disadvantaged by ineffective 'OOF' 'teaching' was discussed from opposing viewpoints. Some respondents indicated that student disadvantage was a side effect of 'OOF' 'teaching,' while others asserted that disadvantage was associated with individual *teachers* and how they approach their role, and not 'OOF' *teachers* in general. The latter indicated that a *teacher's* effort into 'teaching' 'HEc' and how serious they consider the task makes them 'effective.' A small number ($n = 3$, 3%) of in-field respondents indicated that 'in-field' teachers are more 'effective' in linking lesson 'knowledge' and 'skills' to real life and essential employment 'skills' (see Table A1b).

Complementing the qualitative comments, respondents also responded to the prompt 'I believe that students perform as well in subjects when taught by out-of-field teachers' on a Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). An independent samples *t*-test compared respondents' mean ratings for in-field ($n = 161$, 83%) and OOF ($n = 33$, 17%). In-field respondent means were significantly lower ($M = 2.4$, $SD = 1.44$) than OOF respondents ($M = 4.1$, $SD = 1.39$; $t(192) = -5.9$, $p = <0.001$, two-tailed). The effect size was large (Cohen's $d = -1.13$), suggesting that in-field teachers do not believe students perform as well in subjects taught by OOF teachers. Conversely, the OOF teachers believe students perform as well when taught by OOF teachers.

Subtheme 3: Time

The 'time' it takes to enable 'OOF' *teachers* to be 'effective' was discussed by 15% ($n = 15$) of respondents. This subtheme highlighted the 'time' pressure required to prepare resources and understand the 'content' and assessment to teach 'OOF' 'effectively' and engage 'students.' Some respondents reported this as a burden impacting the stress levels they 'feel,' which takes the joy out of 'teaching.' However, others saw it as a component of professional practice (see Table A1c).

'In-field' *teachers* reported that 'OOF' 'teaching' impacts their 'time' as some 'OOF' *teachers* were inexperienced in 'HEc.' They rely heavily on 'in-field' *teachers* to improve their 'efficacy' through resource provision and training. As 'HEc' subjects require out-of-class maintenance and management tasks to be completed to enable 'effective' 'classroom' practices, respondents indicated that 'in-field' *teachers* had to fill these time-consuming roles, which increases the workplace pressure they 'feel' for a range of responsibilities (see Table A1c). One 'in-field' *teacher* explained the OOFT impacts of time on their workflow.

> The impact of having an in-field teacher, replaced by 3 others (2 out-of-field) this year on myself had been big. The out-of-field teachers require extra assistance from the kitchen assistants, and assessment hasn't been completed thoroughly. As the only HEC teacher, I have to ensure curriculum planning is completed for all subjects
>
> (84, IF).

Theme 2: HEc experience, passion, and support

The *HEc experience, passion, and support* theme was evident in the comments of 53% ($n = 53$) of respondents. The subthemes of 'experience,' 'support,' and 'passion' are linked to respondent reports of what is required for an 'OOF' teacher to be 'effective' when 'teaching'

'HEc' (see Figure 3a,b). Although in-field teacher reports formed the majority of these responses (in-field $n=45$, 85%, OOF $n=8$, 15%), there were variations in responses between each group.

Subtheme 1: Experience

Personal 'experience' with 'HEc' 'content' making a more 'effective' 'OOF' *teacher* was discussed by 23 respondents (23%). 'In-field' *teachers* reported that all 'HEc' teachers require expertise and experience to be 'effective' and that being interested in home cooking is insufficient as it differs from the 'classroom' 'practical' environment. When discussing personal 'experience' in home economics contexts, such as food and textiles, as an influencer of 'OOF' *teacher* 'effectiveness,' all OOF ($n=4$) *teachers* self-reported they were 'effective' due to their 'experience' alongside a 'passion' for the 'content,' makeing them 'effective' and 'qualified' for the role (see Table A2a). One OOF respondent reported that this personal 'experience' made them more 'effective' than some 'in-field' *teachers*.

'In-field' respondents considered *teachers* who 'don't' have 'HEc' focused (food and textiles) 'design and technologies' 'qualifications' as 'OOF,' and that they are less 'effective' when 'teaching' the multi-contextual 'subject' 'area.' The impacts included a diversion from 'HEc' 'content' to other 'design and technologies' contexts such as woodwork or digital technologies. A minority of 'in-field' *teachers* reported that 'HEc' 'experience' can be developed over 'time' through a commitment to continued improvement and professional learning, which improves how 'effective' *teachers* can be (see Table A2a).

Subtheme 2: Support

'Support' for 'OOF' 'HEc' *teachers* to enhance 'efficacy' was reported by 22 respondents (22%). As discussed, the 'time' required for 'in-field' *teachers* to 'support' 'OOF' *teachers* can be extensive. Despite this, 'in-field' respondents indicated that adequate and quality 'support' provided by 'experienced' staff for 'OOF' *teachers* to increase efficacy, competence, and confidence is essential. They also noted that 'OOF' *teachers* must be willing to accept 'support' to be 'effective'; otherwise, it was suggested that 'OOF' teachers may not deliver an optimal 'HEc' education to 'students.' In-field teachers suggested professional development 'support' as a strategy to enhance 'OOF' *teacher* 'efficacy' (see Table A2b).

'Support' from 'in-field' *teachers* was reported by two 'OOF' 'HEc' *teachers* as critical for 'effective' 'teaching.' The benefits were reported to include enhanced knowledge of 'HEc' and greater collaboration (see Table A2b). The following comment by an in-field respondent who has taught OOF provides insight into the impact of not receiving adequate or quality 'support.'

> Last 3 years being made to take a subject that you have no concept or understanding of. No training/PD has ever been offered… my HOLA finds it amusing; I don't… I am pulled out to teach something I know nothing about
>
> (24, IF).

Subtheme 3: Passion

Having a 'passion' for 'HEc' was reportedly a factor impacting *teacher* 'effectiveness' by 20% ($n=20$) of respondents. In-field respondents ($n=16$) reported that 'OOF' *teachers* performance is influenced by their passion for 'HEc,' which helps them generate knowledge. They also highlighted that having a 'passion' for 'HEc' alone is not enough to make an 'effective' 'OOF' *teacher*; rather, it needs to be accompanied by 'support,' interest, and a willingness to learn to increase their level of 'HEc' 'knowledge' and 'skill.' Other 'in-field' respondents discussed the perspective that 'in-field' *teachers* have the professional background to be passionate about providing quality education by delivering a meaningful student-centered curriculum. It was

also suggested that 'in-field' *teacher* 'passion' impacts student subject selection and that OOFT is often prescriptive, not passionate, which does not support quality education (see Table A2c).

'OOF' *teacher* perspectives ($n=4$) varied from 'in-field' respondents. They stated that *teacher* 'qualification' was irrelevant to being 'effective.' Rather, 'passion' and interest were more important. These respondents also indicated that putting in 'time' and effort overrode 'qualification,' as did being dedicated to providing an 'effective' education. An OOF respondent identified willingness to learn the 'content' to be an 'effective' 'HEc' *teacher*, as passion should lead them to undertake professional learning to become 'qualified' to 'teach' the 'subject.' An in-field respondent agreed and indicated that 'passion' 'supports' theory learning.

Theme 3: Skills

The need for an 'OOF' *teacher* to have 'practical' 'home economics' *skills* to 'effectively' 'teach' within the 'classroom' was reported by 44% ($n=44$) of respondents. This theme is linked to the subtheme of *HEc experience*, which embedded perspectives regarding having 'experience' in 'HEc' *skills* and how this may influence 'OOF' *teacher* 'effectiveness' (see Figure 3a,b).

Subtheme 1: Practical skills

Practical skills were discussed by 25% ($n=26$) of respondents. 'In-field' *teachers* reported the importance of 'HEc' being 'taught' by 'in-field' *teachers* as they have the 'practical' 'skills' essential for 'effective' 'teaching,' student success, and future student career opportunities. The perspective that 'OOF' *teachers* were not 'effective' in 'practical' lessons as they did not possess essential 'home economics' *skills* was discussed exclusively by 'in-field' respondents ($n=17$, 17%). It was indicated that 'OOF' *teachers* often miss the development of vital skills and that 'OOF' teachers could not sequentially develop *'student'* skills 'effectively' while differentiating according to varied 'student' needs. The ability of the 'OOF' *teacher* to 'effectively' conduct demonstration lessons to apply 'practical' *skills* in food and textiles contexts was also challenged. These responses indicated that 'student' *skill* development was hindered by 'OOF' *teachers* who could not 'effectively' demonstrate 'home economics' *skills* (see Table A3a).

'In-field' *teachers* also challenged the ability of 'OOF' *teachers* to 'effectively' teach the range of food and textiles *skills* embedded in 'home economics' 'subjects.' This was accompanied by comments of 'OOF' *teachers* being challenged by their ability to run a practical classroom due to limited skills. 'In-field' respondents also expressed concern over the coping capacity of 'OOF' *teachers* when managing 'practical' 'classrooms.' One respondent indicated how stressful this can be for some 'OOF' *teachers*: 'They came and saw me beforehand during a cooking class. They looked white as a ghost and said to me, "They are out of their seats! With knives! How do you do it?" I chuckled (15, in-field).' (see Table A3a).

An 'in-field' respondent reported that 'OOF' *teachers* can be effective if they have sound skills. Conversely, five 'in-field' respondents reported that just because an 'OOF' *teacher* does possess 'home economics' related *skills* in food and textiles, it does not mean they are 'effective' *teachers*. One OOF respondent agreed with the latter; however, two OOF respondents reported that their skills in HEc contexts make them effective practical teachers (see Table A3a).

Subtheme 2: Safety

'OOF' *teacher* safety management *skills* were discussed by 18% ($n=18$) of respondents. 'In-field' respondents reported that they question 'OOF' *teacher* ability to manage the hazards and risks of 'practical' 'home economics' 'food' and 'textiles' lessons. The ability of OOF *teachers* to undertake specific tasks, including writing WHS, such as risk assessments and safe working procedures, led to 'in-field' respondents reporting that OOF teachers struggle with safety procedures. 'In-field' respondents indicated that ineffective 'OOF' *teacher* safety management

places 'students' and *teachers* at a risk of injury and pressures high-risk environments. One respondent reported that '… the woodwork teacher taught food and cut the top of his finger off' (1, in-field), illustrating the impact of concerns raised (see Table A3b).

Theme 4: Depth of knowledge

Varied perspectives regarding the *depth of knowledge* 'OOF' *teachers* possess, which impacts their 'effectiveness,' were discussed by $n=32$ (32%) respondents. 'In-field' *teachers* often positioned 'OOF' *teachers* as 'ineffective' as they 'don't' have the 'depth' of 'knowledge' when 'teaching' 'home economics' compared to 'in-field' *teachers*, which impacts 'students.' Converse reports were identified but were the minority (see Figure 3a,b).

Subtheme 1: OOF teachers do not have deep HEc knowledge

The perspective that 'OOF' *teachers* 'don't' have the *depth of knowledge* required to 'effectively' 'teach' was reported by $n=21$ (21%) respondents, with 95% being in-field. A small number of in-field respondents ($n=4$, 4%) reported 'feeling' out of their 'depth' when 'teaching' 'OOF', also reporting low PCK, which impacted their enjoyment and 'effectiveness' when 'teaching.' Respondents focused on the limited capacity for OOF teachers to apply the 'Design and Technologies' 'curriculum' mandated design process and attributed reduced 'OOF' *teacher depth of knowledge* as a barrier to 'effective' lesson structures. Direct links were made to the limited PCK of 'OOF' *teachers*, and it was also suggested that not having a deep knowledge may impact assessment quality (see Table A4a).

The assessment practices of OOF HEc teachers were explored quantitatively through two survey questions. Respondents rated the following statement: 'The assessment tasks I use capture home economics requirements' on a Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). An independent *t*-test was conducted to compare the means of in-field and OOF teacher responses. The mean response provided by in-field respondents was significantly higher than OOF respondents ($p=0.006$) with a medium effect size (Cohen's $d=0.55$). This indicates that in-field teachers were more confident their assessments met requirements; however, means for both in-field and OOF respondents aligned with the 'agree' to 'strongly agree' portion of the Likert scale (see Table 4).

The second prompt was, 'I believe that assessment practices of OOF teachers are equivalent to in-field home economics teachers' and an independent *t*-test compared the response means. The mean for in-field respondents was significantly lower than OOF respondents ($p=<0.001$) with a large effect size (Cohen's $d=-0.81$). This finding suggests that in-field teachers do not regard OOF HEc teachers' assessment practices to be equivalent to in-field teachers. Conversely,

TABLE 4 Independent samples *T*-test summary of respondent perspectives of in-field vs. OOF teacher assessment practices.

	In-field HEc respondents		OOF HEc respondents					
Survey statement	**M**	**SD**	**M**	**SD**	***df***	***t***	***p***	**Cohen's *d***
The assessment tasks I use capture home economics requirements	5.6 ($n=154$)	0.8	5.1 ($n=31$)	0.98	183	2.8	0.006	0.55
I believe that assessment practices of OOF teachers are equivalent to in-field home economics teachers	2.6 ($n=161$)	1.36	3.7 ($n=33$)	1.44	192	−4.2	<0.001	−0.81

OOF respondents somewhat agreed that OOF teacher assessments were equivalent to those of in-field teachers. The large effect size indicates that the respondent qualification had a large effect on this outcome (see Table 4).

The 'student' impacts of OOF teacher *depth of knowledge were* reported by three in-field respondents who indicated that optimal 'student' outcomes and positive experiences are more likely to occur when taught by 'in-field' *teachers* (see Table A4a). An example comment: 'I teach 2 subjects that I am not qualified to teach, and I find it hard to understand the work just like the students, I feel I am learning while they are learning it too… (80, IF)'.

Subtheme 2: Some OOF teachers have deep HEc content knowledge

Although in-field teachers reported concerns over 'OOF' *teacher depth of knowledge*, six respondents (6%) indicated that some 'OOF' *teachers* have deep 'knowledge' of 'home economics,' making them 'effective.' Some respondents indicated 'OOF' *teachers* can develop *depth of knowledge* if they educate themselves to enhance their classroom efficacy. Two 'OOF' respondents reflected this, who reported they work hard to learn the content to enhance their 'teaching' 'effectiveness' and accuracy (see Table A4b).

DISCUSSION

This study compares in-field and OOF home economics teachers' beliefs regarding teaching effectiveness and student learning when OOFTs deliver subjects compared to in-field teachers. As mentioned by Overschelde (2022), this study further reveals statistically significant differences in the reported beliefs of HEc teacher effectiveness between in-field and OOF teachers. It considers potential impacts by identifying three key findings: firstly, teachers and their beliefs, self-efficacy, well-being, and PCK limitations; secondly, implications for students; and thirdly, the implications for HEc as a specialist subject area. Additionally, the findings identify subthemes, such as practical skills, learning experiences, support, confidence, and culture linked to HEc. Figure 4 provides a summary of the four key findings from the study.

The implications of OOFT on home economics

First, there is a disparity in the beliefs of the effectiveness of in-field and OOF teachers, with in-field teachers reporting they are more effective than OOF teachers at a statistically significant rate. OOFT does not concur with this belief and regards their effectiveness as consistent with in-field teachers. Second, the respondents reported a decline in self-efficacy when teaching OOF, with confidence and competence returning statistically significant findings. Third, respondents reported a decline in well-being when they teach OOF. Fourth, pedagogical content knowledge and, hence, the teaching and learning repertoire are narrowed when OOF teachers deliver home economics, particularly practical skills, safety skills, and core knowledge. These findings have implications for the effective delivery of the subject, for teachers, and for students, as summarized in Figure 4.

Implications for the subject

This study reveals that when OOF teachers deliver home economics, three areas related to the subject emerged from the data, all with adverse effects. First, the lack of expertise to use equipment and resources effectively with damage due to safety, behavior, and classroom management challenges. Second, reduced offerings of elective aspects of home economics due to a lack

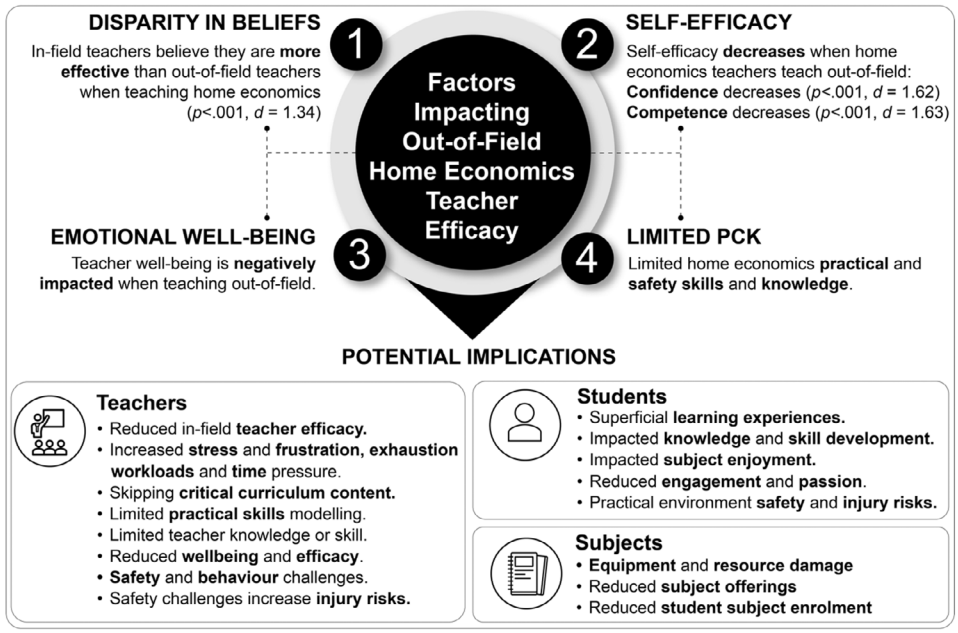


FIGURE 4 Factors and implications of OOFT in HEc.

of OOF teacher expertise. Third, fewer students are studying electives due to a lack of expert teachers and, hence, a lack of confidence held by students. The findings indicate exposure to expertise development influences teachers' self-efficacy and professional identity (Nazari & De Costa, 2022; Riordain et al., 2022).

Implications for teachers

This study reveals that when OOF teachers deliver home economics, there are eight areas of implications related to teachers, all with adverse effects on the effective enactment of the curriculum. First, the reduction of in-field teacher efficacy due to the demands of mentoring OOF teachers. Related to this, increased stress and frustration with additional workloads and time pressures. Third, the skipping of critical curriculum content. Fourth, limited practical skills modeling opportunities. Fifth, limited teacher knowledge and skills competency. Sixth, reduced well-being. Seventh, challenges related to safety and behavior management, and finally, increased risk of injury due to a lack of safety capabilities specific to the field.

Implications for students

This study also revealed that when OOF teachers deliver home economics, there are five areas of implications for students, all with adverse effects. First, superficiality of the delivery of the learning experiences, which reduces learning outcomes. Second, and related, knowledge and practical skill development are compromised. Third, related to practical skill development is the increased risk of injury due to unsafe practical environments for learning. Fourth, OOF teaching reduced home economics students' subject enjoyment, and finally, reduced passion and engagement. These impacts lead to reduced learning outcomes, which aligns with findings from Overschelde (2022).

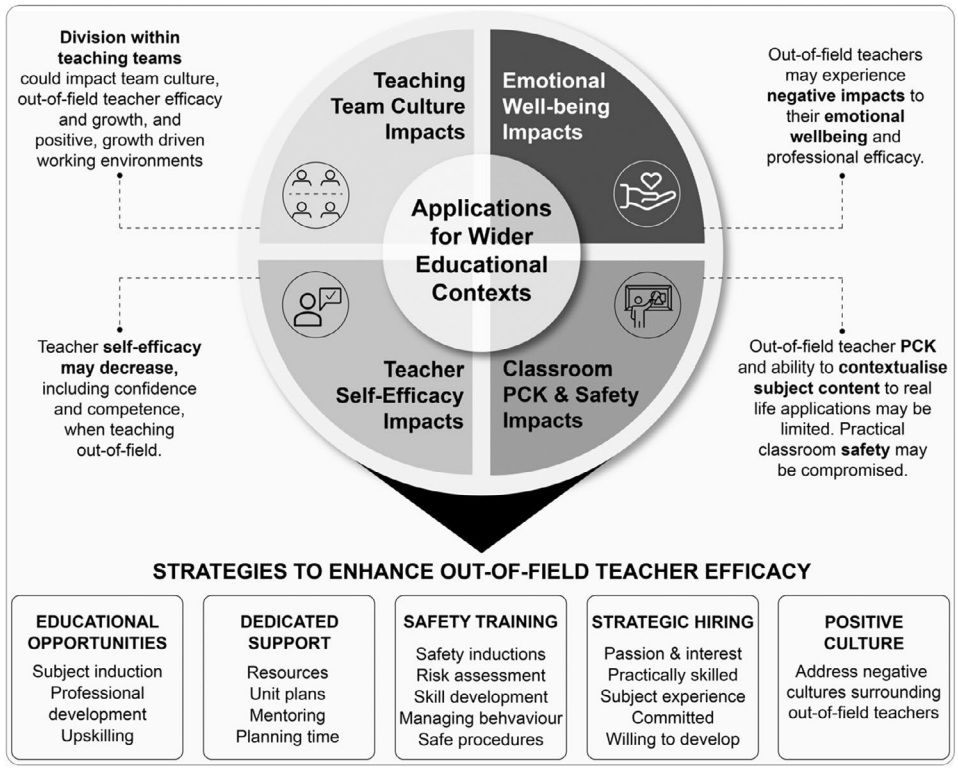


FIGURE 5 Application of results to wider educational contexts.

Implications for wider educational contexts

This study focused on a field where more than 2 in 5 teachers are OOF (AITSL, 2023). The findings are not only applicable to HEc but also to the wider educational context where OOF teaching is a common strategy employed to address teacher shortages, with up to 1 in 4 teachers OOF in Australia (AITSL, 2023). This study reveals that the impacts are profoundly negative, leading to long-term consequences for the field, teacher well-being and self-efficacy, and student learning.

Discussion of the key findings and considerations beyond the specific field under examination to the wider education sector is presented in Figure 5, with four areas applicable to the wider OOF teaching phenomenon, all with negative consequences: reduction of teacher self-efficacy; negative impacts on emotional wellbeing; lack of PCK expertise leading to compromised delivery and classroom safety; and adverse effects on teacher team culture.

Given the reliance of the workforce on OOF teaching, importantly, this study sought to identify strategies to enhance OOF teacher effectiveness. Five strategies emerging from this study have the potential to enhance OOF teacher effectiveness (Figure 5). First, increasing opportunities for upskilling in subject-specific areas to develop PCK, and related to this, the second strategy recommends skill development and procedures targeted to the area of teaching. Third, provide support through mentoring, resource sharing, and planning time. Fourth, undertake strategic hiring when appointing OOF teachers so that, where possible, teachers have an interest, if not related experience, in the area they will teach. Finally, create a positive culture around OOF teaching as a practice. These intentional strategies can be employed to address the negative impacts of out-of-field teaching. Adopting them as a key priority for the Australian teacher workforce is recommended.

CONCLUSION

Teaching OOF is a reality in around 1 in 4 classes taught in Australia (AITSL, 2023). The impacts are increasingly concerning for an already depleted workforce, with negative implications for teacher identity and satisfaction (Riordain et al., 2022), self-efficacy (Castro et al., 2023), and student learning outcomes (Overschelde, 2022). Our study confirmed this is a concern for home economics, where more than 40% of teachers are reportedly OOF. The findings point to adverse effects for the subject, teachers, and students, with out-of-field teachers narrowing their teaching repertoire as a common way of managing their lack of self-efficacy. The findings in this paper underline suggestions in the 2024 Australian National Teacher Workforce Action Plan and specific priority areas such as improving *teacher supply in specific subject* areas, *keeping the teachers we have*, and *elevating the profession*. Five broad strategies to enhance out-of-field teacher effectiveness are proposed, emerging from this study, providing positive opportunities to address what is likely to be a growing rather than a declining trend in teacher shortages (Australian Government, 2024). It is our recommendation that these strategies be prioritized to address the challenges associated with OOF teaching.

This study examined the impacts of out-of-field teaching in home economics and added a new dimension to the existing knowledge base. While findings generally align with those of other studies, a new insight from this study is the reported narrowing of the repertoire of skills and knowledge typically employed by teachers working out of field. The impact of depleted skills and knowledge in targeted teaching areas has consequences in other discipline-specific teaching areas, with a flow-on effect that disrupts the effectiveness of the broader skilled workforce. Passions and skills for future work are ignited or extinguished in school. Schools need skilled and passionate teachers to ensure a robust future workforce.

AUTHOR CONTRIBUTIONS

Donna Pendergast: Conceptualization, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Writing–original draft, Writing–review and editing. **Sarah McManus**: Data curation, Formal analysis, Investigation, Methodology, Project administration, resources, Validation, Visualization, Writing–original draft, Writing–review and editing. **Anna Du Plessis**: Conceptualization, Investigation, Resources, Supervision, Validation, Writing–review and editing. **Jay Deagon**: Conceptualization, Investigation, Resources, Validation, Writing–original draft, Writing–review and editing.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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APPENDIX A

EVIDENCE MATRIX TABLES

TABLE A1 Theme 1 teachers: respondent quotes.

Subtheme, *N* = 103	Topic	In-field responses (*n* = 90, 87%)	OOF responses (*n* = 13, 13%)
(a) Efficacy *n* = 37 36% *n* = 33 (IF) 89% *n* = 4 (OOF) 11%	**Self-efficacy when teaching OOF**		
	Out of depth, overwhelmed, inexperienced, or ineffective	'I felt out of my depth and did not know what I was doing…' (1, IF). '… trying to teach in out-of-field areas becomes overwhelming… (7, IF)'. 'The main reason I don't feel I am as effective out-of-field is that I lack experience in building up resources and narratives or examples from past experience…' (62, IF).	'…I don't think I teach it to the same level as a qualified HEC teacher' (97, OOF). 'We also have an out-of-field teacher teaching one lesson of HEC per week to fill up her timetable and she hates it and it shows in her teaching' (94, OOF).
	Reduced confidence and/or well-being	'…I am not as confident in what I am doing' (18, IF).	'My well-being is affected when I teach out-of-field' (93, OOF).
	Feeling challenged	'Teaching out-of-field can be challenging…' (42, IF). '…I find it hard to understand the work just like the students; I feel I am learning while they are learning it too' (80, IF).	
	Self-efficacy when teaching in-field		
	Less stress and anxiety and improved self-efficacy	'Teaching what you are 'trained to teach reduces your stress and anxiety levels' (23, IF). 'Teaching in-field… improves teacher self-efficacy' (85, IF).	
	Feeling skilled, prepared, happy, confident, and competent	'I certainly feel well-skilled and prepared when I teach in-field' (37, IF). 'I am happier which reflects in my confidence and competence' (58, IF).	
	Effective classroom management, enhanced teaching quality, and student engagement	'…classroom management is generally more effective, and your quality of teaching is far greater' (23, IF). 'Student engagement is linked to teacher well-being' (85, IF).	
	Effectiveness when working alongside OOF teachers		
	Experiences of frustration, difficulty	'Their way of delivering content is very different from HEC teachers and can be frustrating…' (17, IF). 'I find managing teachers who are out-of-field difficult' (37, IF)	
	Effectiveness of OOF teachers		
	Effectiveness of OOF teachers is individually dependent and influenced by commitment	'Some out-of-field teachers can be very effective in teaching HEC, but they are generally teachers who have sound kitchen skills and knowledge and an interest…' (6, IF). 'Sometimes an out-of-field teacher works really hard to gain an understanding of knowledge and content; they then create fun and engaging lessons' (89, IF).	'I think it's entirely dependent on the individual' (100, OOF).
	Inductions and support impact effectiveness	'It also depends on how well the teacher is inducted into the learning area' (15, IF). '…depend on the… support offered by those around them' (87, IF).	

(Continues)

TABLE A1 (Continued)

Subtheme, $N=103$	Topic	In-field responses ($n=90$, 87%)	OOF responses ($n=13$, 13%)
(b) Student impacts $n=19$ 18% $n=18$ (IF) 95% $n=1$ (OOF) 5%	**Student learning**		
	Students experience deeper learning and enjoyment from in-field teachers	'…they enjoy the subject more, getting a deeper understanding of the concepts and subject content' (9, IF).	
	In-field teachers set higher expectations and can extend students	'…higher expectations come from in-field' (20, IF) '[OOF] teachers struggle with… being able to extend students' (59, IF).	
	Are students disadvantaged by OOFT?	'Students are disadvantaged when teaching out-of-field' (45, IF). 'Some [OOF] teachers take the subject seriously. They put in the effort to ensure that the students aren't disadvantaged. Whilst others just turn up on the day and wing it, it is very disappointing…' (76, IF).	'I believe that my students benefit equally from the subjects I teach in-field or out-of-field because I put my heart and soul into ensuring they get the best possible experience' (98, OOF).
	In-field teachers more effectively contextualize HEc content to real life	'As a HEC teacher, I am able to always link what I am teaching to the traditional foundations of individual and community care as well as global wellbeing' (10, IF). 'Having the qualification, you have a better understanding of… industry requirements' (74, IF).	
(c) Time $n=15$ 15% $n=13$ (IF) 87% $n=2$ (OOF) 13%	**The time it takes for OOF teachers to be effective**		
	The time pressure of OOFT causes stress	'Stressful and time consuming…' (8, IF). 'It's the time required to keep proficient in out-of-field areas that takes the joy out of teaching' (77, IF).	
	Dedicating time to OOFT is professional practice	'Whenever I have taught out-of-field, I have dedicated significant time to learning content, unpacking the assessment to ensure I understood requirements. I have observed other teachers doing likewise because we are educated professionals' (42, IF). 'Over time, experience can teach you how to deliver and assess this subject better' (19, IF).	'Teaching out-of-field requires additional work at home to prepare for class as I need to first learn to do the task myself, so I can feel somewhat confident teaching the class' (97, OOF). '…willing to learn the subject and put in the time and effort to prepare for the lessons' (94, OOF).
	OOF teachers rely on in-field teachers time for resources, training, and maintenance tasks	'A lot of pressure can be placed on the trained teacher, eg., time, organizing resources, training them etc.' (57, IF). 'When we have teachers out-of-field, experienced teachers need to pick up the slack, which involves making resources to use for scaffolding, cleanup duties in the kitchen, ordering of ingredients, laundry duty, servicing of sewing machines and overlockers' (54, IF). '…time of someone who is to support them' (41, IF).	

Note: The shading indicates that there was no evidence of responses aligning to the topic from either IF or OOF respondents.

TABLE A2 Theme 2 HEc experience, passion, and support: respondent quotes.

Subtheme, $N = 103$	Topic	In-field responses ($n = 90$, 87%)	OOF responses ($n = 13$, 13%)
(a) Experience $n = 23$ 22% $n = 19$ (IF) 83% $n = 4$ (OOF) 17%	**Personal experience with HEc**		
	Teacher expertise and experience make them effective	'Expertise and experience need to be taken into account. A qualified HEC teacher also needs the skills and experience in a wide field of practical applications to be an effective teacher' (66, IF). 'I feel strongly about the fact that I should be teaching a subject in-field. I am highly qualified and feel confident that I can contribute in the field. I have many years of experience, and this reflects in my teaching' (69, IF). 'I do think that having a background of knowledge provides you with a more rounded approach to teaching. You do not have that with out-of-field subjects' (67, IF). 'Life experience and confidence in an area is why I took the role; my personal experience and passion about quality nutrition is why I took the role' (60, IF). 'I feel that I am a very effective teacher in the HEC fields that I teach. I am primarily trained but have much industry experience that has made me qualified for the role' (12, OOF who self-identified as IF).	'But I have 10 years of hospitality experience and 8 years of sewing experience making costumes. So I think life experience should be taken into account. My life experience makes me more qualified than some HEC-trained teachers in my school, especially when it seems I received more real-world experience than they received in their studies' (92, OOF). 'Even though I am not officially "qualified" to teach HEC, I brought a competent level of expertise from my private life…' (99, OOF). 'I think industry experience and a science degree are probably not as bad as other out-of-field teachers without even a food handling certificate' (102, OOF). 'I feel the skills I have in the teaching field as a generalist and my personal experience of HEC content enable me to teach HEC safely and effectively… I cook, run a household with two children, sew, and have worked as a nanny. I have a good knowledge of food, cooking skills, nutrition, and safety despite not being trained by an institution in this area' (103, OOF).
	Home cooking experience is not enough to make an OOF teacher effective	'[P]eople think they can teach cooking as they cook at home. They don't understand the science or how to manage the risks. (53, IF)' 'However, many do not seem to understand and be willing to commit to the true intent. One staff member said, "oh, this is how I do it at home"' (74, IF).	
	Experience in design and technologies	'Design and technologies teachers are working in the textile and food space, with no expertise in these areas. therefore students are designing products more to do with wood, recycling, or ICT (25, IF)' 'Challenges having out-of-field teachers delivering a DT curriculum, covering a broad range of topics and having no experience in the kitchen, safety, etc. Devalues those that are in-field' (71, IF). 'Untrained HEC teachers think because they can cook at home, they are then experts at HEC in schools as well!' (4, IF).	
	Experience can be developed over time	'Over time, experience can teach you how to deliver and assess this subject better. But you need to want to improve and keep learning' (19, IF).	

(Continues)

TABLE A2 (Continued)

Subtheme, $N = 103$	Topic	In-field responses ($n = 90$, 87%)	OOF responses ($n = 13$, 13%)
(b) Support $n = 22$ 21% $n = 20$ (IF) 91% $n = 2$ (OOF) 9%	**OOF teachers need support to be effective**		
	Adequate quality support by experienced staff is essential for OOF teachers	'Feeling competent and confident is very much linked to the amount of support provided' (3, IF). 'Teachers out of field who have a dedicated mentor teacher can be just as effective and sometimes bring new insights and perspectives that benefit all' (48, IF). 'This is a specialist area, and just because a person can cook or sew, regardless of how well, this doesn't mean they have the skills to teach both areas fully; this usually requires the skill, experience, and time of someone who is to support them' (41, IF). 'I have been lucky when teaching out-of-field that i was able to be mentored by experienced staff members' (26, IF).	'Support of staff trained in HEC allows me to learn more and collaborate' (103, OOF). 'Even though I am not officially "qualified" to teach HEC… and also already had strong support networks in place with other HEC teachers in my area when I needed' (99, OOF).
	OOF teacher willingness to accept support is crucial	'There are times when this out of field teaching has worked, but this requires dedication from both teacher and school to make it work. When one party is not willing, you end up with subpar teaching and student outcomes' (33, IF). 'Effective mentoring and willingness for out of field teachers to act on advice given to them by in field HEC teachers is vital' (16, IF).	
	Professional development for OOF teachers is beneficial	'More face-to-face, teacher-identified curriculum-based PD is needed to upskill in HEc and hospitality' (85, IF). 'In our school context we are actively upskilling teachers to teach HEC-we are excited to note that this has reinvigorated their passion for teaching' (73, IF). 'There needs to be the ability to put trained teachers through supported short courses to assist in their training. This could be supported at a school cluster level' (49, IF).	

TABLE A2 (Continued)

Subtheme, $N = 103$	Topic	In-field responses ($n = 90$, 87%)	OOF responses ($n = 13$, 13%)
(c) Passion $n = 20$ 20% $n = 16$ (IF) 80% $n = 4$ (OOF) 20%	**Subject passion influences OOFT and OOF teachers**		
	Passion influences OOF teacher performance	'Passion for the subject is of utmost importance' (1, IF). 'The performance of an out-of-field teacher is determined by many factors: passion/willingness to learn, support by administration, availability of inservice, acceptance by trained HEC teachers…' (36, IF). 'I am passionate about teaching HEC and feel that teachers who are out of field are not doing justice to the subject' (63, IF).	'I love teaching HEC, and it is not the area I trained in, I take my job very seriously…if you love the subject and your job you are capable of being a brilliant teacher out-of-field' (94, OOF). 'If you are passionate about subjects taught in HEC and are willing to learn the ropes, you can become more than qualified' (95, OOF). 'I believe that my students benefit equally from the subjects I teach in-field or out-of-field because I put my heart and soul into ensuring they get the best possible experience' (98, OOF).
	The passion of an IF teacher enhances quality education	'It is vital that they have the professional background to be effective, passionate skill developers and share understanding, knowledge, and passion for their craft' (44, in-field). 'When teaching in your area of expertise, I believe there is a high level of commitment and passion for the content and development of a meaningful student centred curriculum' (51, IF).	
	IF teacher passion influences student subject selection	'I chose the subject HEC, at high school because of a passion for the subject and amazing teachers who also had a love for the subject. Those teachers were qualified in HEC' (27, IF).	
	OOFT influences teacher passion and quality education	'When you teach out of field, it is prescriptive teaching, not passionate' (81, IF). 'I am passionate teaching HEC and feel that teachers who are out of field are not doing justice to the subject' (63, IF).	
	Passion should drive OOF teacher learning	'Teachers can learn the theory – if they have an interest or passion' (49, IF).	'I think if a person is passionate about their out of field work, they should undertake training to become qualified' (96, OOF).

Note: The shading indicates that there was no evidence of responses aligning to the topic from either IF or OOF respondents.

(Continues)

TABLE A3 Theme 3 skills: respondent quotes.

Subtheme, *N* = 103	Topic	In-field responses (*n* = 90, 87%)	OOF responses (*n* = 13, 13%)
(a) Practical skills *n* = 26 25% *n* = 23 (IF) 88% *n* = 3 (OOF) 12%	**In-field teachers have HEc skills, and OOF teachers may not**		
	IF teachers have HEc skills to ensure effective teaching to support student success	'In HEC education, I believe that the best teachers have had explicit HEC education/teacher training. There is a lot of knowledge (how to run a practical cookery class in 60 minutes, for example.)' (88, IF). 'I believe that the subject of HEC requires an in-field HEC teacher to be effective. This is a practical subject that requires specific skills to be able to function at an effective level, ensuring the success of students' (28, IF). 'I certainly feel well skilled and prepared when I teach in-field' (37, IF). 'A qualified HEC teacher also needs the skills and experience in a wide field of practical applications to be an effective teacher. HEC curriculum incorporates a range of core learning areas as well as the skills for future job opportunities.' (66, IF).	
	OOF teachers are not effective in practical lessons		
	OOF teachers are not effective in practical HEc lessons as they do not have adequate skills	'Teachers who are out-of-field often miss teaching vital information relating to skills when in the kitchen', (83, IF). 'Sequencing practical skills is particularly difficult when teaching students who may be at varied stages in their learning, but out-of-field teachers may not necessarily understand how to build or backtrack skills' (10, IF). 'In my experience, out-of- field teachers do not have the breath and depth of knowledge or skills with inaccuracies and watered down curriculum the result' (31, IF).	
	OOF teachers may not be able to demonstrate practical skills	'In a practical subject area, when a teacher is teaching out of field, it is obvious when they don't have those practical skills themselves, so they are unable to demonstrate or teach something or teach it correctly when they cannot do it themselves. Students leave the subject with little to no skill in some cases' (13, IF). 'I teach differently in out of field areas-I don't demo/model as much as I am not as confident in what I am doing… as opposed to in HEC, where I am more likely to model skills and knowledge more effectively upfront…' (35, IF).	

TABLE A3 (Continued)

Subtheme, *N* = 103	Topic	In-field responses (*n* = 90, 87%)	OOF responses (*n* = 13, 13%)
	OOF teachers are challenged when running practical classrooms	'The barriers are in their practical skill and ability to run a practical classroom' (49, IF). '… I believe that the best teachers have had explicit HEC education/teacher training. There is a lot of knowledge (how to run a practical cookery class in 60 minutes, for example.)' (88, IF). 'Textiles skills are not something that you can develop very quickly, so allowing a teacher with limited skills in the area to take classes above their skill set severely impacts the experience and the learning opportunities for students' (52, IF).	
	OOF teachers may not cope with managing practical classrooms	'Teachers who do not have training in the area sometimes do not cope very well, especially in the practical management of classes & a lot of pressure can be placed on the trained teacher, eg., time, organizing resources, training them, etc.' (57, IF).	
	Skills and OOF teacher practical teaching efficacy		
	Having HEc skills (food, textiles) does not make an OOF teacher effective	'Untrained HEC teachers think because they can cook at home, they are then experts at HEC in schools as well!' (4, IF). 'This is a specialist area, and just because a person can cook or sew, regardless of how well, this doesn't mean they have the skills to teach both areas fully; this usually requires the skill, experience, and time of someone who is to support them' (41, IF). 'People think they can teach cooking as they cook at home' (53, IF). 'According to schools and some staff, if you like cooking, you can teach it' (78, IF).	'I have actually enjoyed teaching a practical subject, but I don't think I teach it to the same level as a qualified HEC teacher' (97, OOF).
	Having HEc skills (food, textiles) can make an OOF teacher effective	'Some out-of-field teachers can be very effective in teaching HEC, but they are generally teachers who have sound kitchen skills and knowledge and an interest in textiles and design' (6, IF).	'I cook, run a household with two children, sew and have worked as a nanny. I have a good knowledge of food, cooking skills, nutrition and safety despite not being trained by an institution in this area' (103, OOF). 'But I have 10 years hospitality experience and 8 years sewing experience making costumes. So I think life experience should be taken into account. My life experience makes me more qualified than some HEC trained teachers in my school, especially when it seems I received more real world experience than they received in their studies' (92, OOF).

(Continues)

TABLE A3 (Continued)

Subtheme, *N* = 103	Topic	In-field responses (*n* = 90, 87%)	OOF responses (*n* = 13, 13%)
(b) Safety *n* = 18 18% *n* = 17 (IF) 95% *n* = 1 (OOF) 5%	**OOF teacher safety management skills**		
	Managing practical HEc classrooms requires skills which OOF teachers may not have	'Maintaining safety and management in practical environments is a huge skill that out-of-field teachers do not have' (10, IF). 'We have so many unsafe teachers who think cooking is easy. It's the safety and teaching aspect they miss' (72, IF). 'HEC is a practical subject that needs in-field teachers to effectively manage the classroom and the associated social and physical risks' (22, IF). 'WHS standards are vastly different, as well as behavior management standards' (33, IF). 'Out-of-field staff do not understand WHS, writing WHS' (18, IF). 'Out-of-field teachers struggle with safety procedures' (59, IF). 'Safety issues arise when out-of-field teachers are placed into our subject, and it is very rarely addressed' (86, IF). 'Being in a practical subject, you need to be able to keep control and ensure that all are safe and getting their work done. Many out-of-field teachers dont have the ability to come into the kitchens/classrooms as the kids are moving around and interacting with each other', (90, IF).	'I feel the skills I have in the teaching field as a generalist and my personal experience of HEC content enable me to teach HEC safely and effectively' (103, OOF).
	Ineffective safety management places staff and students at risk of injury	'I believe it is both unsafe and unfair to the students and teachers to be placed in a food tech class out of field' (38, IF). 'Out-of-field teachers teaching HEC is dangerous…' (39, IF). 'It puts pressure and undue risk on workshop and high-risk environments' (75, IF). 'I have concerns about the safety of students when in the kitchen when being taught by teachers who are not qualified to teach HEC' (83, IF).	

Note: The shading indicates that there was no evidence of responses aligning to the topic from either IF or OOF respondents.

TABLE A4 Theme 4 depth of knowledge: respondent quotes.

Subtheme, $N=103$	Topic	In-field responses ($n=90$, 87%)	OOF responses ($n=13$, 13%)
(a) OOF teachers do not have deep HEc knowledge $n=21$ 21% $n=20$ (IF) 95% $n=1$ (OOF) 5%	**In-field teachers have HEc skills and OOF teachers may not**		
	PCK and assessment quality of OOF teachers are limited	'In my experience, out-of-field teachers do not have the breadth and depth of knowledge or skills, with inaccuracies and watered-down curriculum the result' (31, IF). '…depth of knowledge about assessment is at a much higher quality when you are trained in the subject area you are teaching' (47, IF). 'The units she completed were not relevant to the subject, and the assessment tasks she had undertaken were almost useless' (78, IF). 'I have taught DT, which included woodwork and electronics and metalwork. I felt out of my depth and did not know what I was doing' (1, IF). 'When teaching out-of-field, I don't have the content knowledge to start with and possibly the skills required, which makes the process more difficult and less enjoyable' (27, IF). 'Out-of-field staff do not understand… the design process…' (18, IF). 'I have found that out-of-field teachers often don't bother with finishing off a lesson well and also do not have a clear understanding about what the lesson intentions are or have the ability to relay to students the success criteria for the lesson. I find this undermines the credibility of the subject' (50, IF).	'I feel that when I am teaching English, I have a range of strategies and tasks that I can bring into play. However, when in Food, I'm having to stick to a clear plan because I don't know enough to be flexible. I work hard at teaching appropriate information that fits the curriculum, but it isn't a natural thing' (101, OOF).
	Student impacts of OOF teacher limited depth of knowledge	'Students get more out of HEC when taught by a teacher that has been trained to teach in the area. They enjoy the subject more, getting a deeper understanding of the concepts and subject content' (9, IF).	
(b) Some OOF teachers have deep HEc knowledge $n=6$ 6% $n=4$ (IF) 67% $n=2$ (OOF) 33%	**Some OOF teacher are knowledgeable**		
	Background knowledge and professional development can make OOF teachers knowledgeable	'Some out-of-field teachers can be very effective in teaching HEC, but they are generally teachers who have sound kitchen skills and knowledge and an interest in textiles and design' (6, IF). 'Whenever I have taught out-of-field, I have dedicated significant time to learning content, unpacking the assessment to ensure I understood requirements' (42, IF).	'If you are passionate about subjects taught in HEC and are willing to learn the ropes, you can become more than qualified. I put the hard yards in learning the content, and I used my prior knowledge in pedagogical and assessment practices to become a great teacher' (95, OOF). '…I work harder to ensure I teach content correctly and ensure information I pass on is current and accurate' (103, OOF).

Note: The shading indicates that there was no evidence of responses aligning with the topic from either IF or OOF respondents.