Developing effective wine educators:

Integrating the theory of pedagogical content knowledge into wine educator train-the-trainer programmes.

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1 Summary

Academic research around education and educator training has explored the various types of knowledge educators need to be successful. One such type of knowledge that is the purview of the educator is Pedagogical Content Knowledge (PCK). For the first time, this paper frames wine educators and their training within the academic literature of PCK.

Through an extensive literature review, focus groups and surveys, this paper shows that wine educators frequently employ PCK strategies in their teaching. Despite a potential lack of formal recognition of PCK, these educators utilise its principles and seek opportunities to enhance this knowledge beyond classroom practice.

A technique common in educator training programmes is micro-teaching, where participants are given the opportunity to teach short lessons and receive feedback. This research conducted an experiment to evaluate the efficacy of micro-teaching within the context of wine education, finding it was an effective method in increasing educators' level of PCK.

Finally, through interviews, this paper explores how several regional wine bodies are structured and how they use educator training. This paper then synthesises the insights from these interviews with the needs expressed by educators, forming recommendations on how educator training can be enhanced to meet the requirements of both educators and regional wine bodies. Recommendations for these programmes include a continued emphasis on content knowledge alongside methods and materials to increase educators' teaching skills.

2 Introduction

Train-the-Trainer Programmes (TTPs) are courses designed to equip experienced professionals with the skills to teach or train others in a specific discipline. Academic research has explored the knowledge and skills required to make these programmes successful. In the wine industry, TTPs are used by organisations such as the Wine & Spirit Education Trust (WSET) and regional wine bodies like Conseil Interprofessionnel du Vin de Bordeaux (CIVB) and Consejo Regulador DOCa Rioja. Research has yet to evaluate and frame these wine-focused TTPs through an academic lens.

The academic Lee Shulman first introduced the division of educator knowledge into several distinct categories in 1986, a framework that has since become foundational in the field and continues to influence educational theory today. Among these categories, three play a crucial role: (1) Content Knowledge (CK), (2) Pedagogical Knowledge (PK) and (3) Pedagogical Content Knowledge (PCK).

CK is knowledge about the subject. PK is knowledge about how to teach, transcending content-specific knowledge, covering teaching strategies in general.

PCK combines these two concepts to be “the knowledge about transforming content into a teachable form” (Mazibe, Coetzee, and Gaigher, 2018). Shulman states: “It represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction” (Shulman, 1987).

Educators with a high level of PCK adapt the subject matter to align with students' needs and learning environment, superseding static, universal methodologies employed by those with a lower level of PCK. For example, when teaching how the soils of left bank Bordeaux allow for the ripening of Cabernet Sauvignon, an educator with a high level of PCK would react and adapt to the students in the class alongside other external or internal factors, delivering a dynamic educational experience. On the other hand, an educator with a lower level of PCK would apply the same technique to all their classes irrespective of these other factors.

To date, no academic research evaluates wine educators' PCK. This raises the first Research Question (RQ):

> **RQ1.** To what extent do wine educators incorporate PCK into their teaching practices, and how do they perceive the benefits of this?

Outside of wine, PCK is incorporated into many TTPs (Depaepe, Verschaffel, and Kelchtermans, 2013). There are several subject-specific ways in which TTPs can be used to increase educators' PCK.[1] One common strategy is reflective micro-teaching sessions[2], where educators deliver short lessons to their peers, who act as students and then provide feedback.

Using reflective micro-teaching as a lens of PCK, this paper asks:

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[1] Ball, Thames and Phelps (2008) discuss teaching mathematics; Mishra and Koehler (2006) discuss education technology.

[2] For example, see: Allen and Ryan (1969); Boz and Belge-Can (2020); Etkina (2010); Ledger and Fischetti (2020)

RQ2. To what extent do wine educators' PCK increase through reflective micro-teaching?

Having examined the first two questions, the paper puts the two together to frame them within the context of wine TTPs.

Unlike in formal education, where TTPs are typically governed by centralised bodies,[3] the wine education sector presents a landscape with a plurality of regional bodies and non-governmental private organisations (such as WSET). These bodies shape TTPs based on various theories, objectives, and regional specificities, introducing a complex spectrum of programmes. Focussing on regional bodies, this leads to the question:

RQ3. What is the structure of regional bodies' TTPs, and to what extent is reflective micro-teaching used or could be used to increase educator PCK of the region?

By exploring these questions, this research aims to bridge the gap between pedagogical theory and its practical application, thereby enhancing the efficacy of wine TTPs with the aim of developing effective wine educators.

[3] For a discussion on European standards, see Tonna and Bugeja (2018); for a discussion on American best practices, see Cochran-Smith and Reagan (2021); for the policy and practice of teaching mathematics in 17 countries, see Tatto et al. (2012).

3 Literature Review

3.1 Pedagogical Content Knowledge (PCK)

Those who can, do. Those who understand, teach (Shulman, 1986).

The academic and educational psychologist Lee Shulman argued that neither subject-matter expertise nor pedagogical prowess was the dominant knowledge required for an effective educator. Instead, he introduced the concept of Pedagogical Content Knowledge (PCK) — a "special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of professional understanding" (Shulman, 1987).

Since its inception, scholars have explored and constructed diverse models of PCK, underscoring its pivotal role in educator development and training (see Carlson and Daehler, 2019; Cochran et al., 1993; Gess-Newsome, 2015; Magnusson et al., 1999). PCK has been explored in general[4] and through the lens of specific fields.[5] Figures 1-2 display two models of general PCK, while figures 3-4 show two models of subject-specific PCK.

[4] For example, Shluman (1987); Grossman, (1990); and Cochran, DeRuiter and King (1993).

[5] For example, Berry, Friedrichsen and Loughran (2015) investigate several topics of science, while Mazibe, Coetzee, and Gaigher (2018) focus on physics and Agathangelou and Charalambous (2020) on mathematics

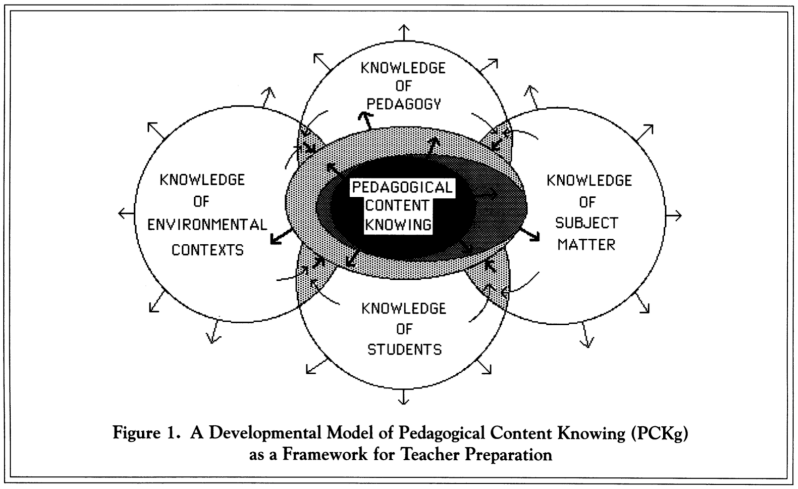


Figure 1. A Developmental Model of Pedagogical Content Knowing (PCKg) as a Framework for Teacher Preparation

Figure 1: A general model of PCK (Cochran, DeRuiter and King, 1993).

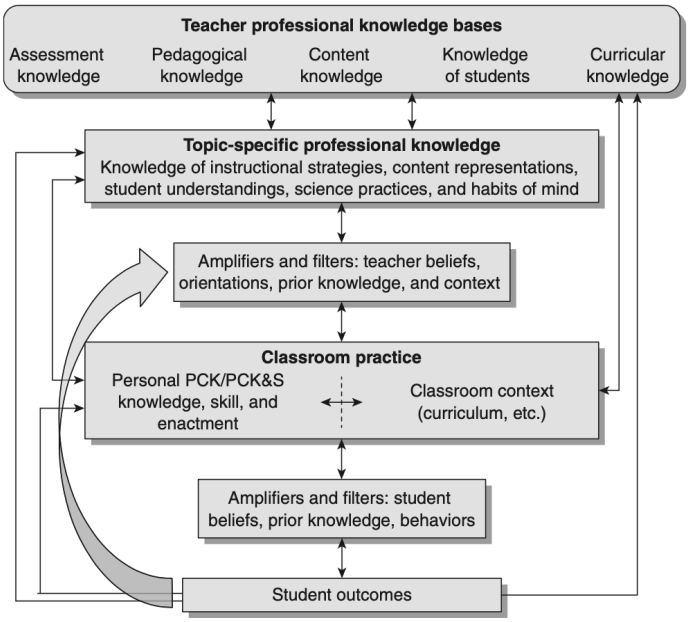


Figure 2: A general model of PCK (Gess-Newsome, 2015).

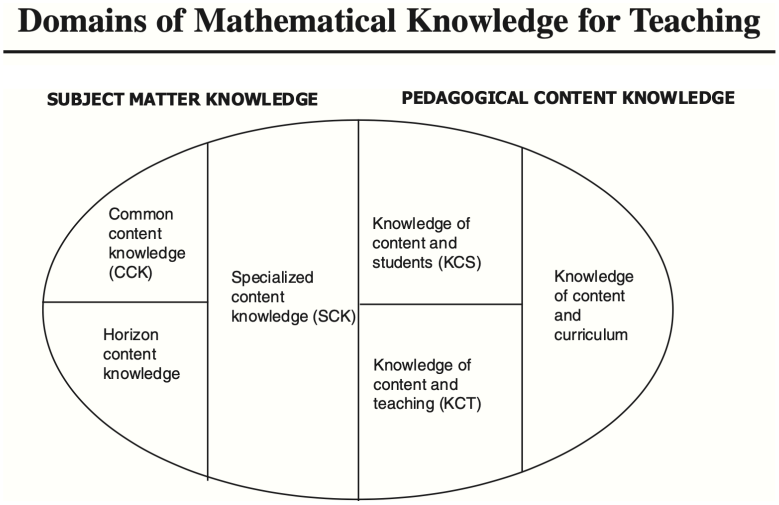


Figure 3: Specific PCK model for mathematics (Ball, Thames and Phelps, 2008).

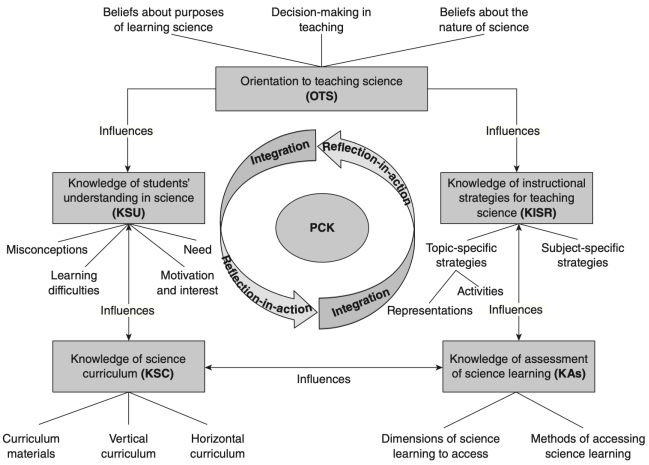


Figure 4: Specific model of PCK for science (Park & Chen, 2012).

These many interpretations of PCK have led some scholars to suggest that its ambiguity means it is impossible to define, questioning PCK's validity and relevance. For instance, Ball, Thames, and Phelps (2008) initially did not consider PCK as a given. However, their research led them to conclude that there is indeed a distinct set of knowledge known as PCK, separate from CK and PK, which, despite being difficult to formulate, exists for effective educators.

Recognising the difficulty in capturing PCK, Loughran, Berry and Mulhall (2012) began "to explore what 'pedagogical content knowledge' really means, what it looks like in practice, and how it might be captured and portrayed for others" (ibid.). Using science as their field of choice, they created a framework to ground the theoretical:

> *The first element is what we have called a CoRe (Content Representation; pronounced 'core') which offers an overview of the particular content taught when teaching a topic. The second element is what we have called PaP-eRs (Pedagogical and Professional–experience Repertoires; pronounced 'papers'), which are succinct, but specific accounts of practice that are intended to offer windows into aspects of the CoRe (Loughran, Berry and Mulhall, 2012).*

Their research examines how experienced science educators approach these topics[6], breaking them into smaller sections. The educators' "approach to capturing and portraying PCK hinges on the understanding that the teaching and the content must be represented in ways that both maintain the complexity of their relationships but at the same time offer some way of seeing through the complexity in order to gain insight into it" (ibid).

Figure 5 shows the CoRe template they developed (ibid).

[6] Topics include particle physics, the circulatory system, and genetics (ibid).

CHAPTER 3

Year Level for which this CoRe is designed.	IMPORTANT SCIENCE	
	BIG IDEA 'A'	BIG IDEA 'B'
What you intend the students to learn about this idea.		
Why it is important for students to know this.		
What else you know about this idea (that you do not intend students to know yet).		
Difficulties/ limitations connected with teaching this idea.		
Knowledge about students' thinking which influences your teaching of this idea.		
Other factors that influence your teaching of this idea.		
Teaching procedures (and particular reasons for using these to engage with this idea).		
Specific ways of ascertaining students' understanding or confusion around this idea (include likely range of responses).		

Figure 5: CoRe template (Loughran, Berry and Mulhall, 2012).

3.2 PCK and wine education

A review of 11 wine education programmes across the globe shows two distinct tracts of programmes.[7] The first concerns academic fields such as viticulture, winemaking, or marketing, which a university accredits. This form of education serves those who

[7] See appendix A for a list of programmes reviewed.

aspire to be involved in a specific part of wine production or the wine business. The PCK required for these topics shares many similarities with existing research on PCK.

The second tract is a general understanding of wine. While this covers some viticultural and oenological issues, it also covers cultural and business factors. This form of wine education requires understanding certain scientific elements that balance with legal, historical and cultural factors.

To date, no research has explicitly analysed this second type of wine education within the framework of PCK.

While the majority of studies in wine education primarily examine its impact on consumer outcomes and preferences, such as market share or sales (e.g., Taylor, Dodd and Nelson, 2008), a few studies suggest the presence of wine-focused PCK.

For example, Corsi et al. (2009) provide evidence that Asian students in Australia exhibit a greater appreciation and willingness to purchase wines when instruction emphasises the wine's region of origin rather than its grape variety. These findings underscore the effectiveness of a region-focused teaching approach for this demographic. Such an approach resonates with Shulman's pivotal concept of PCK, emphasising that educators require knowledge of strategies that most effectively reshape learners' understanding (Shulman, 1986). In this context, teaching from origin proves to be a more fruitful strategy than focusing solely on grape variety.

Similarly, LaTour, LaTour and Feinstein (2011) demonstrate how when “people learn about the process and details of wine production” rather than through “printed tasting notes”, participants were more “likely to rate the wine as being higher quality and

willing to pay a higher price for it" (ibid.). As with the previous study, this suggests how educators could adapt their teaching techniques to achieve their aims.

3.3 Measuring PCK

Acknowledging the elusive character of PCK, scholars have adopted multi-method approaches to measure educators' level of PCK. Table 1 summarises these methodologies from the literature.[8]

Table 1: Measuring PCK

Technique	Definition
Conceptual maps	Graphical tools that demonstrate a teacher's understanding and integration of content and pedagogical knowledge.
Self-reported levels of PCK	A measure of how much a teacher believes they know about the subject matter and how to teach it.
Interview	A conversation between a researcher and a teacher or teachers, in which the teacher is asked questions about their knowledge of the subject matter and how they teach it.
Observation	A researcher observes a teacher teaching, and takes notes on the teacher's knowledge of the subject matter and how they teach it.
Document analysis	Analysis of lesson plans, teacher journals, or other written materials to infer levels and types of PCK.
Case study	A detailed study of a particular teacher or group of teachers, in which the researcher collects data from a variety of sources, such as interviews, observations, and document analysis.

[8] See Alimuddin, Tjakraatmadja and Ghazali (2020); Baxter and Lederman (1999); Großschedl, Welter and Harms (2018); Kagan (1990); Rohaan, Taconis and Jochems (2009).

Given that no prior research has explored wine educators through the lens of PCK, interviews emerge as especially pertinent in this context, as they afford the opportunity to delve into nuanced perceptions, decisions, and reflections of educators, thereby providing a window into their PCK (Baxter and Lederman, 1999). Furthermore, given the exploratory nature of studying PCK in wine education, self-reported measures offer invaluable insights. Such self-assessments empower educators to articulate their sense of efficacy, preparedness, and expertise (Van Driel and Verloop, 2002).

3.4 Developing educators' PCK and the use of micro-teaching

Developing educators' "PCK is an important goal to focus on in professional development programs" such as TTPs (Van Driel and Berry, 2012). One common strategy to increase educators' PCK is incorporating reflective micro-teaching sessions in TTPs.[9] Originated by Allen and Ryan (1969), micro-teaching entails a short teaching exercise where educators present brief lessons (a micro-session) to a small group of their peers, followed by feedback discussions. Micro-teaching's controlled setting enables educators to refine their instructional techniques, test content delivery methods, and gain immediate feedback from peers and observers.

[9] For a list of studies and analyses of such programmes, see Boz and Belge-Can (2020).

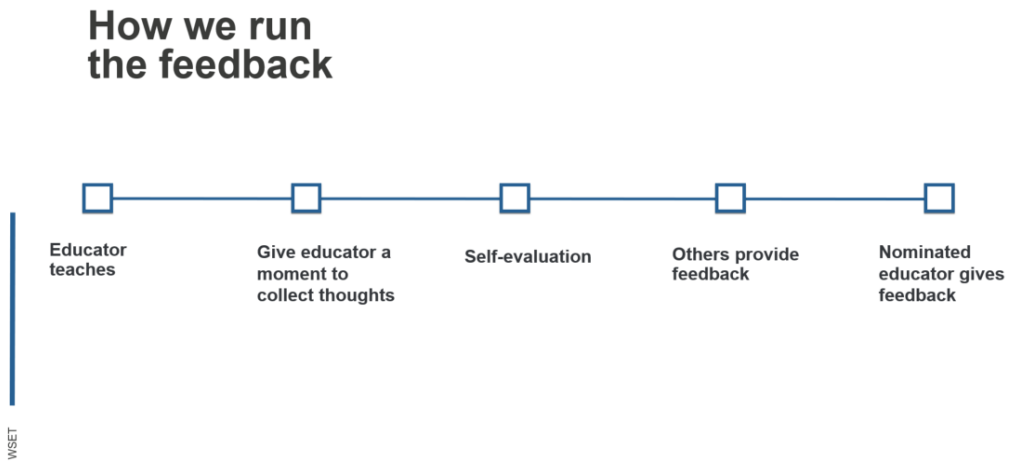


Figure 6: Slide from WSET TTP on micro-teaching (WSET, 2023).[10]

One critique of micro-teaching is that it might only partially address the challenges of an actual classroom where students have distinct needs and knowledge (Allen and Ryan, 1969). Moreover, the truncated lesson duration might restrict deeper exploration of specific pedagogical techniques. Despite these concerns, micro-teaching remains a useful tool, particularly in contexts where the teaching domain is still in its nascent stages, such as wine education (Boz and Belge-Can, 2020; Ledger and Fischetti, 2020;).

3.5 Regional wine bodies' Train-the-Trainer Programmes

Regional bodies cover larger areas (such as Wine Australia) and more localised areas (such as Napa Valley Vintners). Although they may have many purposes, principally,

[10] The term "nominated educator" refers to the primary instructor at a WSET approved course centre. One key role they have is to observe and give feedback to their fellow educators (WSET, 2023).

they aim to elevate the global recognition and reputation of wines from their provenances and foster collaboration among producers.

Many of these bodies champion the unique wine styles of their respective regions. However, as Bruwer and Johnson (2010) argue, attempting to create a singular image for wine is not always possible, given the diversity that exists within many wine areas.

For instance, the many indigenous Greek grapes make it challenging to categorise ‘Greek Wine’ as a singular unit. Therefore, when the regional body ‘Wines of Greece’ was formed in 2002, one of its many aims was to “improve knowledge of production and the market” (Wines of Greece, 2023).

This is a common theme shared by many regional wine bodies. However, each body approaches marketing differently. One method used by several regional wine bodies is a Train-the-Trainer Programme (TTP). These TTPs take influential educators, communicators and other wine influencers and train them to talk about that region successfully. To date, no academic research has been published analysing these programmes, nor does any research yet exist that frames them within the discourse of educator training.

4 Methodology

A mixed-method approach was adopted for the research.

4.1 RQ1: wine educators' level of PCK

4.1.1 Qualitative data collection

Given the germinal state of PCK in wine education, focus groups were chosen as a valid method to begin interrogating PCK levels in wine educators.

Following the guidelines by Krueger and Casey (2015) and Fusch and Ness (2015), three focus groups, including one pilot, were carried out to reach saturation. These groups blended online and in-person formats to minimise travel and maximise global reach. The pilot focus group tested the validity of questions by gauging the quality of the discussions they stimulated. No questions were changed after the pilot focus group.[11] The focus group discussions were recorded and transcribed, allowing for content analysis.

Participants met the following criteria:

- Primary profession as a wine educator
- Hold a high-level wine qualification
- Availability to participate in one of the four focus groups

[11] The full list of questions can be found in the appendix.

Participants were given a brief introduction to the concept of PCK and were provided with an example via a variation of a CoRe.[12] This provided context for the discussions that followed.

Participants were asked to think of scenarios in their teaching similar to the illustrative instance given. For example, they could describe how they have adapted their explanation of a complex oenological concept that students previously struggled to grasp. This discussion explores the extent to which PCK, while not necessarily explicit, is incorporated into their teaching practice. It gives educators the space to touch upon some of the key elements of PCK outlined in the literature review, revealing the extent to which educators use PCK in the classroom and the extent to which they perceive the benefit of PCK.

4.1.2 Quantitative data collection

Participants were sent a follow-up survey approximately 1-2 weeks after the focus groups. This consisted of Likert-scale and free-response questions, producing ordinal data for key themes and further comments. This survey delved into participants' general wine knowledge, their perceived level of teaching, and their perceptions about PCK post-discussion.

4.1.3 Analysis methods

The transcribed focus group discussions were analysed using content analysis techniques prescribed by Gioia, Corley, and Hamilton (2013). This approach aligns with the philosophy that qualitative data analysis should focus on identifying,

[12] See appendix B for the example used in the focus groups.

analysing, and interpreting patterns or themes within the data (Braun & Clarke, 2006). Adhering to this method, data underwent an iterative coding process from first-order concepts to second-order themes, culminating in aggregate dimensions explored in the results. An educational specialist verified this process to validate the final list.

The free-response section of the post-focus-group survey was analysed similarly.

The quantitative data was subjected to statistical analysis, with the statistical significance set at $\alpha=0.05$, as this is standard practice, to discern patterns and correlations. Given the survey's small sample size, the data was interpreted through appropriate statistical tools, such as measures of central tendency (mean, median) and measures of dispersion (standard deviation). When applicable, a Fisher's Exact Test was used to determine statistical significance. These approaches facilitated a nuanced understanding of educators' perceptions and allowed for the validation of qualitative findings. All statistical analyses underwent validation by a subject matter expert in statistics to ensure methodological rigour.

This two-step design, integrating quantitative data from the survey with qualitative insights from the focus groups, facilitated a comprehensive analysis of the qualitative findings.

4.2 RQ2: effects of micro-teaching

4.2.1 Qualitative data collection

A quasi-experimental single-group pretest-posttest design was employed to assess the influence of reflective micro-teaching on wine educators' PCK. Seven wine

educators were invited, using the same criteria outlined in 4.1.1.[13] The WSET TTP uses a form of reflective micro-teaching, so it was essential to recruit educators who had and had not completed this TTP.

Each educator was instructed to prepare and deliver a 15-minute session on a specialised wine-related topic, with the freedom to select both the topic and its delivery level. The topics were shared beforehand to ensure no duplication of topics amongst the participants.

On the day of the experiment, prior to the micro-sessions, semi-structured 1-2-1 interviews were held to set a baseline for educators' PCK for all covered topics. The questions used in these short interviews were derived from the focus group questions from RQ1. These interviews were recorded.

The experiment took place in London, and the micro-teaching began after a short introduction to the project. Each educator delivered their 15-minute micro-session while the other educators acted as students at the desired level.

After each micro-session, educators engaged in self-reflection and received peer feedback. The researcher noted who had provided feedback and categorised the content of this feedback. 'Positive' feedback implied no suggestions for improvement, whereas 'constructive' feedback included advice for enhancement. This was repeated for all seven presentations. No recordings were made.

[13] Seven had been recruited to ensure that if there had been a dropout, six educators would present. All seven educators attended the experiment.

After the experiment, participants were again interviewed individually. These interviews were recorded and transcribed.

4.2.2 Quantitative data collection

Quantitative data was collected through surveys.

Before the experiment, participants were sent a survey to self-evaluate their level of CK and PCK on the topics being presented. In addition to several free response sections, the survey used Likert-scale questions, which provided ordinal data representative of respondents' subjective evaluations. Following the intervention, an identical survey was sent to the participants again. This allowed for a statistical analysis pre- and post-intervention.

4.2.3 Analysis methods

For qualitative data analysis, both sets of interviews were analysed using the same methods as the focus group transcriptions, extracting pre- and post-intervention themes. These themes were compared, providing insight into the educators' change of CK and PCK following the micro-teaching intervention.

The quantitative data obtained from the Likert-scale surveys was subjected to statistical tests. Descriptive statistics, including means and standard deviations, provided an overview of the central tendencies and variations in the educators' self-evaluations. Wilcoxon signed-ranked tests were conducted to identify statistically significant differences between the pre-and post-intervention responses across the seven topics. When appropriate, a Pearson correlation test was used to analyse any statistical significance between variables. Statistical significance was set at $\alpha=0.05$ as this is standard practice, and a subject matter expert validated all statistical analyses.

Employing these qualitative and quantitative methods provided a multi-dimensional approach to analysing the impact of micro-teaching on educators' level of PCK.

4.3 RQ3: regional wine bodies

4.3.1 Regional body interviews

To understand the structure and characteristics of regional bodies' TTPs, as well as their perspective on the potential use of reflective micro-teaching, semi-structured interviews were carried out with representatives from five such organisations. These bodies were selected due to:

- their global prominence and diverse wine styles
- their availability and willingness to participate
- and that they all run a TTP

These interviews were designed to allow a flexible conversation, allowing interviewees to expand on their answers whilst ensuring that core topics were addressed. The choice of a semi-structured format allowed both specific information to be obtained and unanticipated insights to be uncovered.

The core topics discussed in all the interviews are in table 2.

Table 2: Core topics discussed in regional wine body interviews

Core topics
History and development of the regional body and TTP
Purpose and aims of the TTP
Structure and format of the TTP
Assessment of participants in the TTP (if any)
Who the participants are on the TTP and how they are recruited
Challenges and success of the TTP
Future plans to change the TTP?
How they see their TTP compared to other regions?
General thoughts on having a TTP within a regional wine body
An introduction to micro-teaching and how it might fit into their TTP

4.3.2 Educator perspectives

Obtaining insights from regional wine bodies offers only one side of how micro-teaching can be incorporated into a regional body TTP. To achieve a better understanding and allow for a more robust analysis, educators from the focus groups were asked about their interactions with regional wine bodies, their experiences with the associated TTPs, and suggestions on how these TTPs might enhance wine educators' PCK levels. This produced discussions on the perceived efficacy of these programmes, identifying areas for potential enhancement. Further data concerning educators' perspectives on regional bodies' TTPs was captured in the post-focus-group survey.

4.3.3 Analysis methods

The interviews with the regional wine bodies were recorded, transcribed, and analysed, similar to the RQ1 and RQ2 interviews. Through this process, central themes were identified. These themes were compared with the key themes derived from the focus group perspectives on regional wine bodies, providing insight into

regional bodies' receptiveness to include pedagogical practices, such as the inclusion of reflective micro-teaching.

Integrating data from regional bodies with insights from educators in the focus groups and micro-teaching experiment provided a more nuanced and comprehensive view of enhancing wine educators' PCK level.

4.4 Limitations

The research attempted to mitigate certain limitations as much as possible.

Focus groups could converge onto group think or be dominated by one personality. The researcher ensured that no one person dominated any of the focus groups.

The size and number of the focus groups meant that the sample selection could present a skewed reality. The demographic richness of those interviewed, as evidenced by a diverse range of regions, genders, and experience levels, along with the consistent emergence of common themes across all four focus groups, alleviated the researcher's concerns about potential bias or limited perspectives.

The pretest-posttest experiment involved a small sample size and does not represent all wine educators. Nevertheless, the interviews of the diverse group provided a rich source of data. Furthermore, the limitations of being in London precluded the possibility of more international learning styles.

The potential for sequence effects in the micro-teaching session, where a previous educator may inadvertently alter the delivery of a later educator, was mitigated through two key factors. Firstly, all seven participants conducted a micro-session on an unrelated topic. This meant that no one saw another deliver the same topic.

Secondly, participants were asked to prepare a lesson plan and slide deck before the start of the experiment. They were asked to follow their plan as closely as possible. While a previous educator's delivery style may have affected later educator delivery, these two methods ensured that any sequence effects were minimised, preserving the validity of outcomes (Cohen, Manion, & Morrison, 2018).

Only five regional wine bodies were interviewed. While this number is small, the five provided a depth and richness of data. Each body provided unique insights based on their distinct experiences and practices, providing a deeply informative amount of data.

4.5 Ethics

All interviewees were informed of the purpose of the research and agreed to participate. All focus groups and interviews were recorded, and for the focus group and micro-teaching interviews, all were anonymised. One of the regional bodies is anonymised.

5 Results and analysis

5.1 RQ1: To what extent do wine educators incorporate PCK into their teaching practices, and how do they perceive the benefits of this?

5.1.1 Participants

Participants were sourced through the researcher's professional connections and social media. Prospective participants provided basic demographic data, including location, experience level and gender. Four focus groups were created to reflect a variety of experience levels, regional backgrounds, and an equitable gender distribution as much as possible.[14] Twenty-five participants took part across the four groups from 13 countries.

[14] Gender included options beyond male and female; however, only those two were selected. See the appendix for the full survey.

Table 3: Focus group participants by country

Country	Number of participants
UK	5
USA	4
France	3
Hong Kong	3
Australia	2
Canada	1
China	1
Germany	1
Macau	1
Singapore	1
South Korea	1
Sweden	1
The Netherlands	1
Total	**25**

For the sake of analysis, the countries were grouped into three standard geographical areas:

1. Americas (AMER) — USA and Canada
2. Europe (EMEA) — Europe
3. Asia Pacific (APAC) — China, Hong Kong, Macau, Japan, Korea, Singapore, and Australia

Chart 1: Regional breakdown of focus group participants

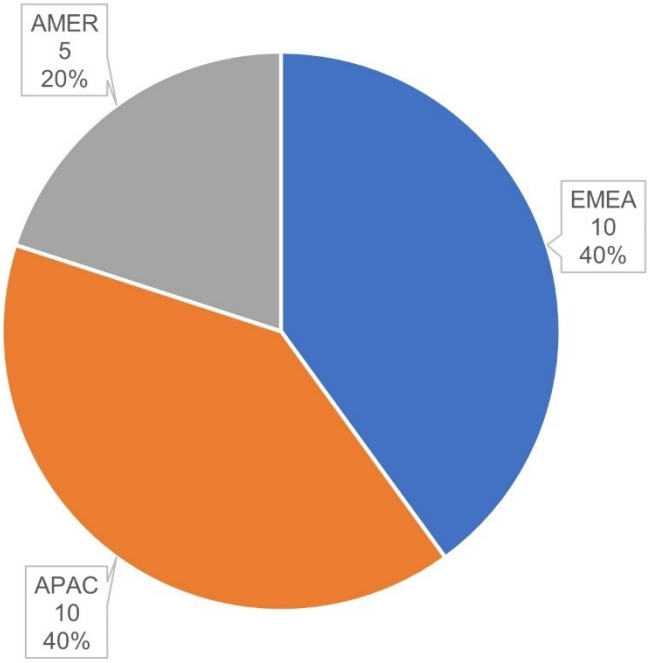
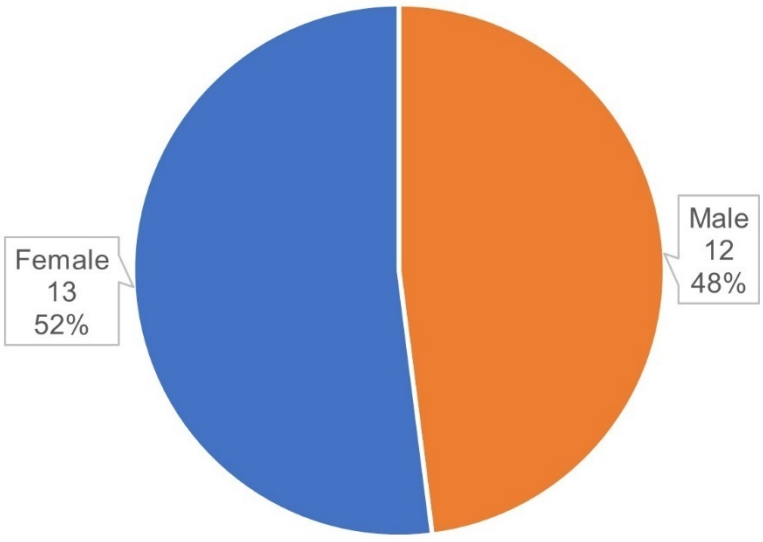
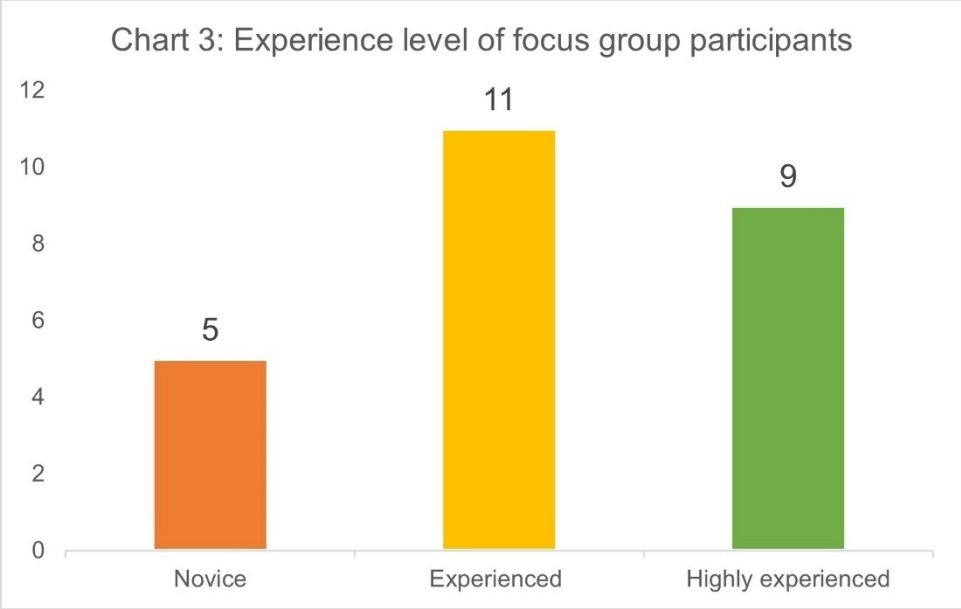


Chart 2: Focus group participants by gender



The data was also parsed by years of teaching. To make the data usable, the 25 educators were put into three tiers of teaching: novice (less than three years of

teaching), experienced (3-8 years of teaching), and highly experienced (8+ years of teaching). Teaching experience only covered wine teaching experience.



These divisions allowed for comprehensive analysis across regions, genders, and experience levels. These divisions were used when analysing the post-focus-group survey, which 21 of 25 educators completed.

5.1.2 PCK techniques incorporated by wine educators

Since most educators[15] were unfamiliar with the concept of PCK, the focus group discussions focused on educators providing examples of their teaching practices. These examples illuminated the various techniques educators used. These techniques were coded using the Gioia method, eventually producing aggregate themes that

[15] 3 of the 25 participants were aware of the concept, and only 1 had extensive knowledge in it.

demonstrated PCK, even though no explicit mention was given. These themes were checked with an education specialist to ensure they represented an element of PCK.[16]

The top four techniques used by the participants were active learning, scaffolding, analogy, and adapting to the student. Table 4 shows each (anonymised) educator's mention of these techniques.[17]

[16] These conversations happened during the analysis phase.

[17] These represent educators who referenced using the technique with a clear example. If the same educator provided two examples of the same technique, this was counted only once.

Table 4: Mentions of the four key PCK methods

Educator	Active learning	Scaffolding	Analogy	Adapting to the students
a	X	X	X	
b	X	X		
c			X	
d			X	X
e	X	X		
f		X	X	
g	X			
h	X	X	X	
I		X		
j	X		X	X
k				X
l	X		X	
m	X		X	
n	X		X	X
o	X	X		X
p		X		
q	X		X	X
r		X	X	X
s	X	X		
t		X		X
u	X		X	
v	X	X		
w	X	X	X	
x				
y		X		X
Total	**15**	**14**	**13**	**9**

5.1.2.1 Analysis of active learning

This technique involves students actively engaging in the learning process rather than being passive recipients. From the discussions, the following second-order themes were identified:

1. Engagement through interactive content (e.g., quizzes)
2. Asking questions to students to stimulate learning

3. Group discussions and collaborative learning
4. Self-reflection on learning
5. Using real-life scenarios

These discussions showed how active learning as a concept varies across regions. Table 5 shows the frequency of active learning mentioned by participants across the three regions. While the quantitative data indicates some parity across the regions, the qualitative data analysis shows active learning is used differently in the three regions.

Table 5: Mentions of active learning by region

Region	Mentions of active learning	Participants from region	Percentage
AMER	4	5	80.00%
APAC	6	10	60.00%
EMEA	5	10	50.00%

Notably, there were differences in how easily active learning was implemented. Educators in APAC (outside of Australia) indicated that they struggled to deploy active learning effectively, not from a lack of effort on their part but rather from resistance to the technique from their students. For these students, the educational culture has historically been educator-led and learning by rote. Active learning is an unfamiliar learning strategy to many of these students. Nevertheless, APAC educators expressed a desire to employ active learning in their teaching; however, they acknowledged that they needed to use additional methods to augment this strategy.

5.1.2.2 Analysis of scaffolding

This technique involves breaking down the learning material into digestible chunks and progressively building up the complexity as students become more competent. From the discussions, the following second-order themes were identified:

1. Step-by-step guidance
2. Building on prior knowledge
3. Use of visual aids to break down information
4. Guided practice and demonstration

When analysing this across regions, there is a stark difference in the number of mentions by region.

Table 6: Mentions of scaffolding by region

Region	Mentions of scaffolding	Participants from region	Percentage
AMER	5	5	100.00%
APAC	6	10	60.00%
EMEA	3	10	30.00%

As table 6 shows, EMEA used scaffolding the least compared to the other regions. However, when mentions of scaffolding were contextualised with the EMEA's use of the other three methods, EMEA had the lowest standard deviation (SD=1.26) across the three regions. This indicates that EMEA's use of scaffolding is consistent with their use of active learning, analogy and adapting to the students.[18]

As educators gain more teaching experience, the use of scaffolding increases, as table 7 shows.

[18] Note that the standard deviations are made under the assumption of using a sample of data not representative of a larger population (Statistical Expert, personal communication, September 2023).

Table 7: Mentions of scaffolding by experience level

Experience level	Mentions of scaffolding	Participants at each level	Percentage
Novice	2	5	40.00%
Experienced	6	11	54.55%
Highly experienced	6	9	66.67%

Novice educators reported challenges with scaffolding, indicating that it often required multiple sessions to explain certain topics confidently. This was further reinforced by the highly experienced educators, who noted that several attempts in different settings were often needed to master an explanation of a topic.

5.1.2.3 Analysis of analogy

Analogy is the technique of taking familiar concepts and using them to explain more complex ones. Through the discussions, the following second-order themes were identified:

1. Relating to everyday experience
2. Use of stories
3. Use of cultural references
4. Use of comparisons

Unlike the prior two techniques, which had wide variation depending on region or experience level, the use of analogy was broadly equal across these two groups.

Table 8: Mentions of analogy by region

Region	Mentions of analogy	Participants from region	Percentage
AMER	2	5	40.00%
APAC	5	10	50.00%
EMEA	6	10	60.00%

Table 9: Mentions of analogy by experience level

Experience level	Mentions of analogy	Participants at each level	Percentage
Novice	2	5	40.00%
Experienced	6	11	54.55%
Highly experienced	5	9	55.56%

When correlating this dataset with the focus group discussions, there was an emphasis on culturally significant analogies. While the content of these analogies might differ across regions, the structure and use of them are similar.

There was a divergent use of this technique by gender.

Table 10: Mentions of analogy by gender

Gender	Mentions of analogy	Number of participants	Percentage
Female	4	13	30.77%
Male	9	12	75.00%

The Fisher's Exact Test was used to test whether there was a significant association between gender and the use of analogy. This test was chosen because of the small sample size of the 25 participants and the 2x2 contingency table. Using the statistical program R, this test yielded a p-value of $p = 0.047$. Since $p<0.05$, there is a statistical association between gender and the use of analogy. This association is further supported when gender is factored into experience level, and the qualitative data is analysed in greater depth.

Table 11: Mentions of analogy by experience level and gender

Experience level	Gender	Mentions of analogy	Participants at each level	Percentage
Novice	Female	1	3	33.33%
	Male	1	2	50.00%
Experienced	Female	1	5	20.00%
	Male	5	6	83.33%
Highly Experienced	Female	2	4	50.00%
	Male	3	5	60.00%

When the focus group dataset is further analysed, a possible reason given by female educators was the need to establish authority and presence when teaching. Telling a story could be seen as a way of simplifying the content, potentially losing credibility with students. Therefore, female educators discussed avoiding this technique to maintain authority over their classes. One female educator said:

> *It is important […] to maintain the fact I am the teacher. Many times, not many, but a few, these sommeliers and technical people, they think, I know more than her. Especially as a woman, so I must be firm. I try to avoid sometimes these silly games, or stories, because they think, we are not learning.*

The data suggests that as female educators gain experience, they may increasingly utilise this technique. Highly experienced educators appear more inclined to use it than their novice counterparts.

5.1.2.4 Adapting to the students

This technique is when an educator takes the same content and adapts it to different sets of students. Through the discussions, the following second-order themes emerged:

1. Cultural and social backgrounds

2. Diverse learning styles
3. Students' knowledge level
4. Language and terminology usage
5. Pacing and timing

Table 12 shows the use of this technique across regions.

Table 12: Mentions of adapting to the students by region

Region	Mentions of adapting to the students	Participants from region	Percentage
AMER	1	5	20.00%
APAC	3	10	30.00%
EMEA	5	10	50.00%

Analysing regional breakdown with qualitative themes reveals some inherent differences among the three regions' class composition.

AMER and APAC educators discussed how their classes tend to be much more homogenous — that is, students share cultural, educational, linguistic and economic backgrounds. In EMEA, however, educators discussed how classes tend to be more heterogeneous — students do not necessarily share cultural, educational, linguistic, and economic backgrounds. In some cases, EMEA educators do not even share the same background as their students. This nuance could account for the higher use of this method in this region, where a more heterogeneous class requires educators to adapt to a diverse student population.

The technique also varied by experience level.

Table 13: Mentions of adapting to the students by experience level

Experience level	Mentions of adapting to the students	Participants at each level	Percentage
Novice	1	5	20.00%
Experienced	6	11	54.55%
Highly experienced	2	9	22.22%

Due to the limited sample size, statistical tests were approached with caution as they might not be appropriate. A chi-squared test was conducted for exploratory purposes, yielding a p-value of $p = 0.466$. This suggests that, within this dataset, because $p>0.05$, there is no relationship between experience level and the use of adapting to students.

Nonetheless, qualitative data analysis indicates that experienced educators adopt this technique, partly driven by heightened confidence and an openness to experimenting with novel approaches, accepting the possibility of failure. Novice educators show lower use of adapting to the students, likely because they are beginning their teaching careers. One participant said:

> *When I started, I used the same technique for the different groups and it sort of worked, but sometimes I could tell some people become less interested. As I become a better teacher, more experience[d], I learn[t] to change. I make new power points, think of better ways to ask questions.*

The 22% of highly experienced educators who employ this technique could point to the fact that educators with 8+ years of experience have already established techniques to tackle difficult topics. Equally, they frequently teach the same types of groups and, therefore, have less opportunity to explore the ability to adapt. One highly experienced educator discusses how he teaches similar groups of students: “I’ve

found my way, I guess, and, yeah, now I have my ways of explaining such and such really well, and I don't change that too much now."

5.1.3 Perceived value of PCK

Initially, the educators participating in the focus group discussions may have been unacquainted with the formal concept of PCK, yet they acknowledged its significance based on their teaching experiences. Classroom experience appeared to foster the development of PCK techniques; however, there was an openness to developing this knowledge through means beyond regular teaching practice.

A shared view among the four groups, reinforced by findings from the subsequent survey, was that the prevailing approach in wine educator training prioritises content knowledge over PCK. Despite this tendency, educators underscored the value of pedagogical skills. In response to inquiries about the components that should be included in wine-focused TTPs, 17 out of 21 respondents (81%) indicated that pedagogical skills should be taught. Section 5.3 discusses this further.

5.2 RQ2: To what extent do wine educators' PCK increase through reflective micro-teaching?

The experiment showed that reflective micro-teaching improved educators' levels of PCK. This is shown through survey data, feedback during the experiment and 1-2-1 pretest and posttest interviews.

5.2.1 Participants

Chart 4 breaks down the participants by gender and whether they have completed WSET's or a regional wine body's TTP.

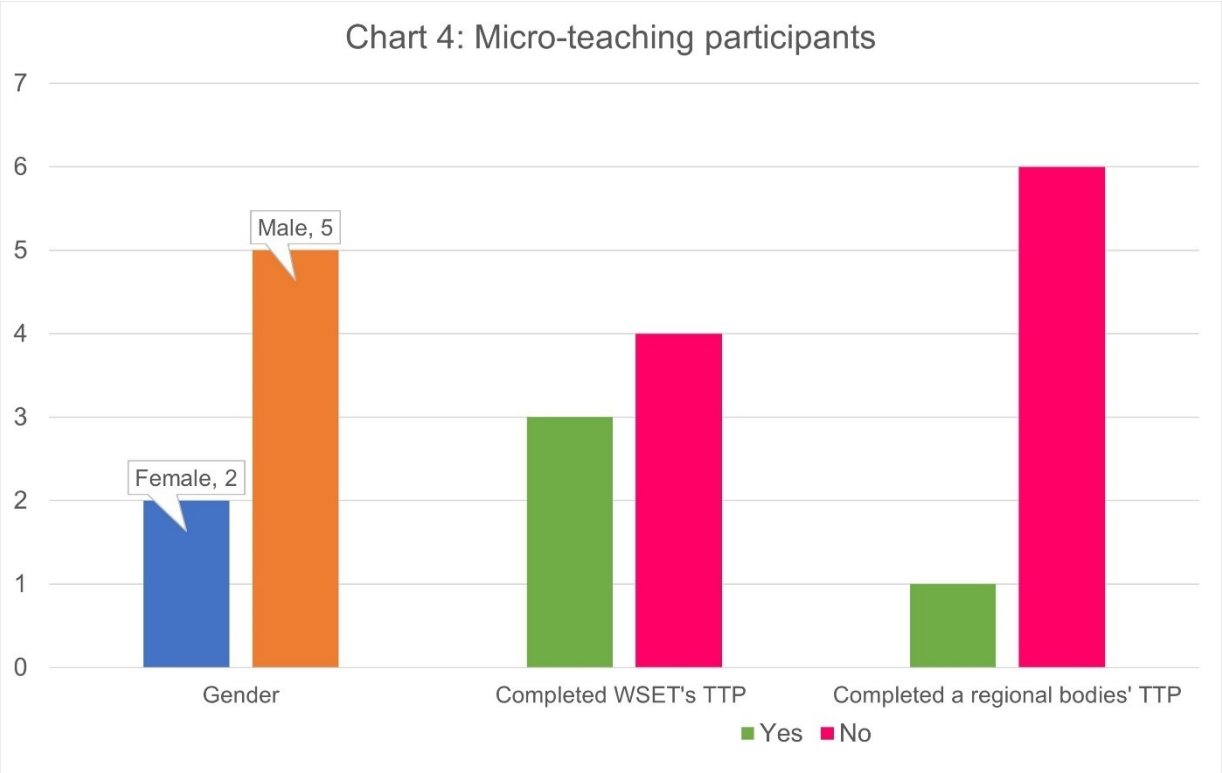


Table 14 illustrates the topics selected by the participants for the micro-teaching experiment, along with the corresponding WSET Level at which each topic was taught.[19]

Table 14: Micro-teaching topics and WSET target student level

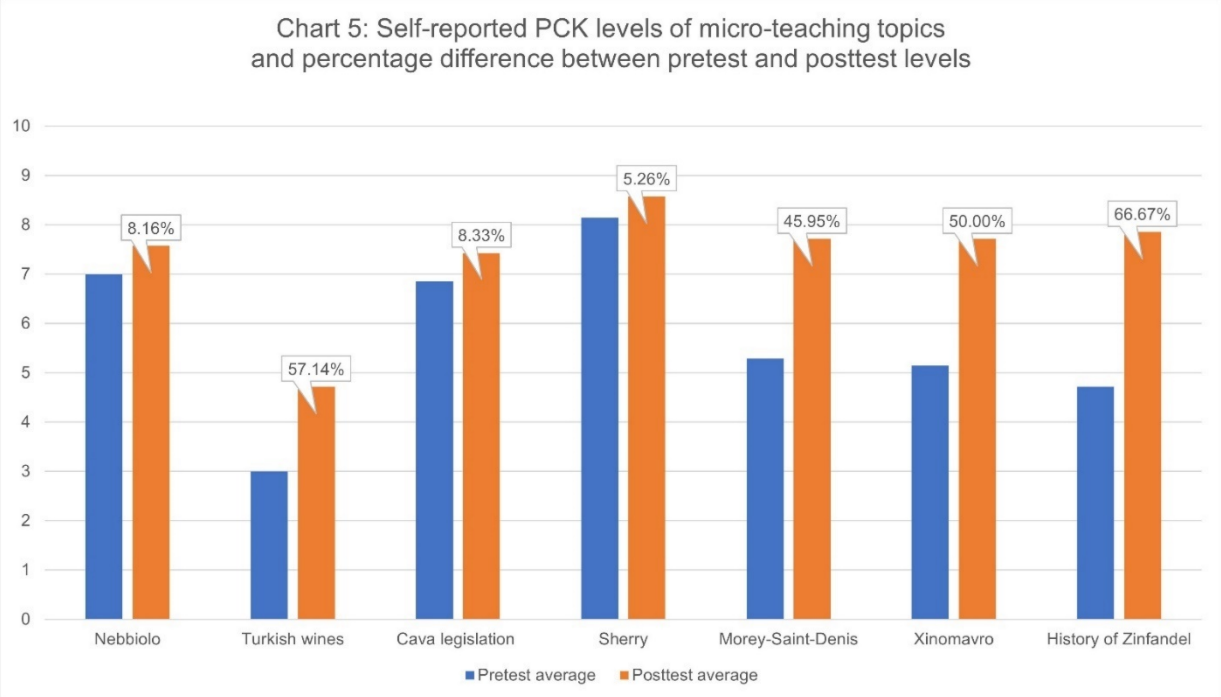
Topic	WSET level
Nebbiolo	Level 3
Turkish wine	Level 2
Cava legislation	Level 4
Sherry	Level 2
Morey-St-Denis	Level 3
Xinomavro	Level 2
History of Zinfandel	Level 1- 4 (mixed)

[19] WSET is well regarded within wine education to define students at each level. Appendix C provides a description of these levels, the participants' original target students and the conversion to WSET Levels.

5.2.2 Statistical analysis of pretest and posttest data

Analysis of the pretest and posttest surveys shows statistical significance in improved PCK for some topics.

In the pretest-posttest surveys, participants were asked to rate their confidence level in delivering all seven topics, including the one they taught and the six they did not, on a scale from 1 to 10, where 1 signifies no confidence, and 10 denotes complete confidence. As depicted in chart 5, there was a rise in confidence for all topics, suggesting an enhancement in PCK.



To test the statistical significance of these changes, Wilcoxon signed-ranked tests were used as the data is non-parametric, and no assumption about a normal

distribution can be made. Furthermore, there were insufficient data points (n<40) to run a two-tailed t-test with reliable results.[20]

The sessions listed in table 15 are arranged in the sequence they occurred during the experiment, each accompanied by its respective p-value.

Table 15: p-value of micro-teaching sessions in running order

Topic	p-value
Nebbiolo	0.583
Turkish wine	0.100
Cava legislation	0.789
Sherry	0.233
Morey-St-Denis	0.035
Xinomavro	0.036
History of Zinfandel	0.035

Despite the percentage change in pretest and posttest levels of self-reported PCK, only the last three have a statistically significant change (p<0.05), with Turkish wine showing a statistically significant result at α=0.10. This raises the question of why and how these three topics underwent a statistically significant increase over the other four topics.

5.2.3 Analysis of session order

5.2.3.1 Improved PCK through improved feedback

After each micro-session, the other educators were invited to share their feedback. This feedback was categorised as either ‘positive’ or ‘constructive’ (see 4.2.1). Table 16 indicates the number of peers providing feedback for each session.[21]

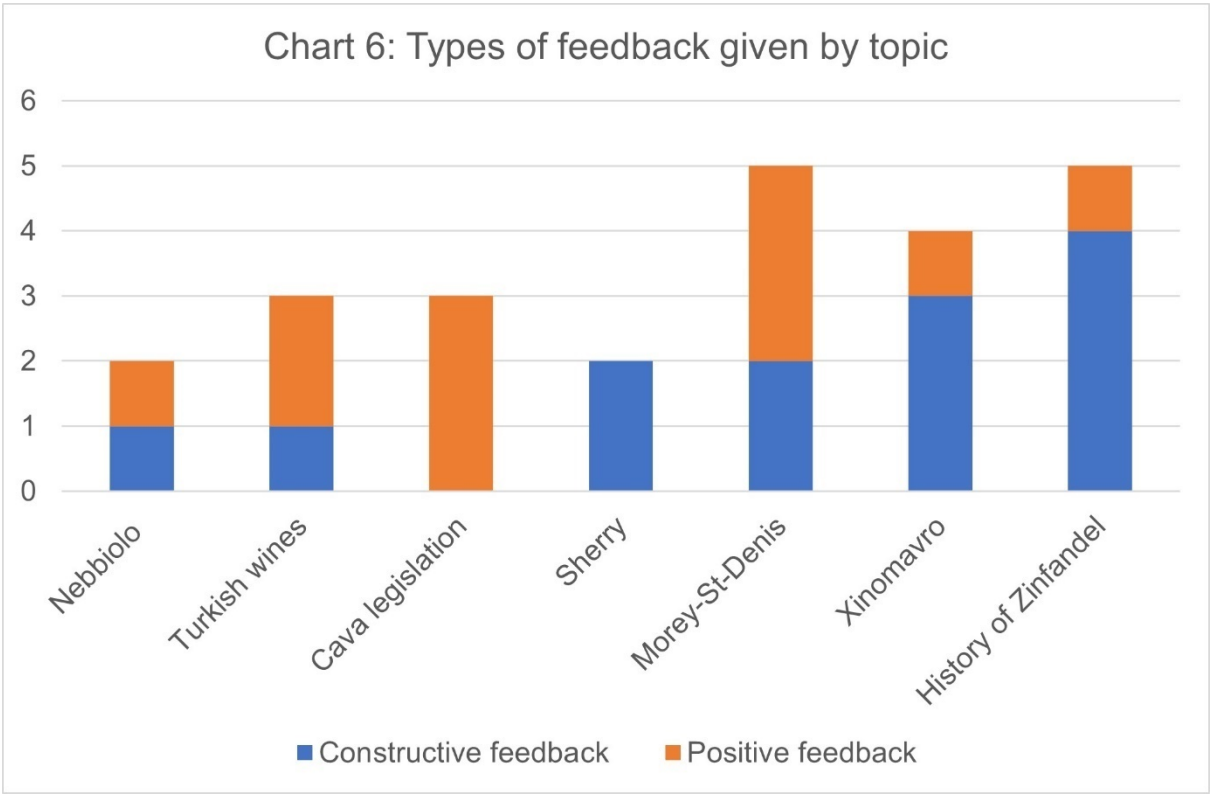
[20] As advised by a statistical expert (Statistical Expert, personal communication, September 2023).

[21] Note that self-reflective feedback was not included in this table. Constructive feedback might also have included positive comments but unlike positive comments, constructive ones offered strategies to improve delivery.

Table 16: Micro-teaching sessions with number of peers giving constructive and positive feedback

Order of micro-sessions	Constructive feedback	Positive feedback	Total
Nebbiolo	1	1	2
Turkish wine	1	2	3
Cava legislation	0	3	3
Sherry	2	0	2
Morey-St-Denis	2	3	5
Xinomavro	3	1	4
History of Zinfandel	4	1	5

Chart 6 visualises this data to show how the feedback given throughout the experiment developed.



This leads to two insights.

Firstly, as educators progressed through the experiment, more educators offered feedback. This can partly be explained by the educators' lack of experience in micro-teaching at the start. As participants became more familiar with the process, they felt

more confident in giving feedback. Furthermore, since the group did not know each other, there might have been resistance to providing feedback at the start.

Secondly, as educators engaged more with the process, their proficiency in discerning pedagogical nuances and critiquing instructional methodologies appeared to be enhanced. For instance, for the first three sessions, participants gave positive feedback, offering praise with little to no suggestions for pedagogical refinement. Participants were much more critical in their analysis in the latter three sessions. The tone shifted from ‘this was good’ to ‘this is how it could be better.’ Tangible suggestions were made on how to improve sections of the micro-sessions.

This increase in the number of peers providing feedback and an increased quality of feedback points to a rapidly evolving sense of PCK.

5.2.3.2 Existing CK and improved PCK

A potential critique of this analysis might be that educators were more at ease offering feedback on topics with which they were already familiar. Table 17 delineates the average of educators’ self-reported CK score (on a scale of 1 to 10, with 1 being the least knowledgeable) about these topics before the experiment commenced. A score above 6 indicates a high confidence in CK.

Table 17: Micro-teaching session order and CK average of pretest survey

Order of micro-sessions	Number of educators offering feedback	CK average from pretest survey
Nebbiolo	2	6.857
Turkish wine	3	2.857
Cava legislation	3	6.429
Sherry	2	7.857
Morey-St-Denis	5	6.286
Xinomavro	4	6.571
History of Zinfandel	5	5.429

This critique assumes a linear relationship between the number of educators giving feedback and levels of CK; such an assumption warrants the use of a Pearson correlation test. Despite the small sample size, such a test was performed using the statistical program R, which yielded a Pearson's correlation coefficient of r = -0.235. This weak correlation indicates a negative relationship, suggesting that, contrary to the argument that more CK leads to an increased number of educators providing feedback, on average, individuals with lower initial CK tend to provide more feedback. However, due to the weakness of this correlation and the limited sample size, no definitive conclusions can be made regarding a significant relationship between self-reported prior CK and the number of educators providing feedback.

5.2.4 Analysis of teaching styles

The sequence of the educators and topics did not influence the subsequent educators' teaching delivery. In the posttest interviews, all educators indicated they delivered the sessions as planned.

Participants were invited to teach using any style they felt comfortable with, so long as the session lasted no longer than 15 minutes. The teaching methods employed by the seven participants were classified into distinct groups for comparative analysis.

- **Active learning**. This included workshops, questioning, group activities, and other interactive elements.
- **Lecture**. This was a teacher-led session characterised by limited or no student interaction.
- **Storytelling**. This was an educator-led session presenting the information as a narrative.

Table 18 combines the teaching styles of the micro-sessions, the sequence ordering and the p-values representing the self-reported pretest-posttest changes in PCK.

Table 18: Micro-teaching sessions, style of delivery and p-value

topic	style	p-value
Nebbiolo	Lecture	0.583
Turkish wine	Lecture	0.100
Cava legislation	Active learning	0.789
Sherry	Lecture	0.233
Morey-St-Denis	Storytelling	0.035
Xinomavro	Active learning	0.036
History of Zinfandel	Storytelling	0.035

This shows that storytelling is the most statistically significant, with active learning presenting a mixed result and lecture presenting, in general, the least statistically significant.

By analysing this data in conjunction with the feedback and interview data, several insights can be made about the effectiveness of these three styles of learning.

5.2.4.1 Analysis of storytelling

The Morey-Saint-Denis (MSD) educator wished to portray the region using history, myth, and art to contextualise a region "sandwiched between two more famous neighbours." In posttest interviews, five educators felt that the storytelling had brought the content to life and the material would be retained for longer by actual students. Furthermore, these educators felt they would be more confident in teaching MSD, which is reinforced by the survey data above.

The History of Zinfandel (HoZ) educator used a sparse PowerPoint deck with pictures corresponding to the narration of his story. Four of the educators in the 1-2-1 interviews suggested that the content of this session would be retained well by real students.

While storytelling was a useful pedagogical tool, the educators who praised this style raised concerns about the reproducibility of these sessions. If educators had to reproduce the MSD or HoZ sessions, they argued it would be challenging, as both sessions relied on the educators' charisma and personality. Specifically, the HoZ educator incorporated picture slides that acted as punchlines to jokes set up in the preceding slides. While these jokes served a pedagogical aim (and added value), the other educators stated that attempting to replicate this session with similar comedic elements might risk their delivery appearing forced or insincere.

5.2.4.2 Analysis of active learning

The Xinomavro topic used a traditional active learning style — with a combination of educator and student talking time. The Cava legislation (CL) educator opted to employ a workshop style of teaching in which the students were put into groups and asked to

think about a topic before presenting it to the group. These slight differences in active learning styles could account for the statistical difference between them.

While exposure to active learning styles yielded mixed quantitative results, it showed much stronger qualitative outcomes. In 1-2-1 interviews, participants saw the value of active learning. One educator commented that they understood the role of active learning better. From their interview, they reflected:

> *how making students answer questions, it just makes the session more interesting, it also made me think as a student and got me to dig into my memory to find the answer.*

In total, this sentiment was shared by five educators in the posttest interviews. They indicated that they would attempt to incorporate more active learning in their future teaching. Therefore, while the CL might not have experienced an increase in PCK for that topic, exposure to the topic allowed the other educators to reflect on their teaching and think how they could improve their teaching for the future.

5.2.4.3 Analysis of lecture

Of the micro-sessions that used lectures, Turkish wine had a p-value closest to rejecting the null hypothesis (p=0.100), while the other two lecture topics held no statistical significance. From the qualitative data, participants reflected on some of the concerns about this style of teaching.

In the posttest interviews, one participant indicated that one of the dangers of a lecture delivery style is going “down a rabbit hole.” When completing a 15-minute presentation, this educator argued, they must learn to “really condense everything into that time period”. By not having an active learning component, although the educator

is in control, their passion for the subject could derail them. There are no checks to their delivery that could keep them more conscious of time or student engagement levels.

As indicated in 5.2.4.2, the three educators who employed this technique reflected that in future, they would incorporate more active learning components. Therefore, by delivering a lecture-style micro-session, receiving feedback on it, and participating as a student in another micro-session, they became exposed to new PCK tools which they can apply to their future teaching, thus demonstrating the effectiveness of micro-teaching to increase PCK.

5.3 RQ3: What is the structure of regional bodies' TTPs, and to what extent is reflective micro-teaching used or could be used to increase educator PCK of the region?

The five regional bodies that were interviewed represent a modest subset of the numerous organisations worldwide. Micro-teaching was used by none of the interviewed bodies, but many expressed an interest in exploring the idea. These findings were analysed alongside results from the focus group discussions to uncover alignment between regional wine bodies' objectives and educators' desire to improve educator skills.

5.3.1 Participants

The regional bodies and the representatives that were interviewed are in table 19.

Table 19: Regional wine bodies interviewed

Organisation	Interviewee	Title
The Wine Studio	Elisa Errea	Designer and developer of Wines from Spain, Spanish Wine Specialist and Spanish Wine Educator; content editor for Rioja Wine Academy
Consejo Regulador DOCa Rioja	Peter Arijs	Education and Global Projects Manager
Organisation A	Person A	President of Organisation A
Instituto dos Vinhos do Douro e Porto, I.P. (IVDP)	Manuel Lima Ferreira	Head of the Tasting Chamber
	Paulo Russell Pinto	Wine Educator and Communicator
Conseil Interprofessionnel du Vin de Bordeaux (CIVB)	Claire Bacchiana	Chef de Project
	Caroline Charpentier	Chargée de développement France
	Donimique Laroche	Bordeaux Wine Head of Learning & Digital

5.3.2 Common structural themes of regional TTPs

Gioia analysis was used on the five interviews. The aggregate thematic analysis found common themes across all five.

1. **Main aim**: These programmes aim to ensure that regional ambassadors are created to communicate effectively about that region. As such, several different people are selected for the course — for example, professional journalists, influential wine buyers and well-placed wine educators. Furthermore, participants were chosen from key markets that are important for the region.

2. **Marketing team Involvement:** Except for the Spanish Wine Educator programme, TTPs sat within the purview of the marketing team (or equivalent) of the regional wine body.[22] All saw education and educator training as a means to produce ambassadors for their region. The TTP exposes educators to consistent messages and up-to-date information, which might not yet have cascaded into more general wine study materials.
3. **Country visits:** An integral part of the TTPs involved educators visiting the region. Indeed, in the post-focus-group survey, the average importance rating given by the 21 respondents for visiting the region was 9.3 out of 10 with a SD ≈ 1.07 and a median of 10.

   This immersive experience was deemed essential by educators to gain a thorough understanding of the region's terroir, culture, and wine production techniques. Since storytelling has proven successful as a teaching method that enhances educators' PCK (see 5.2.4.1), these direct experiences should significantly enrich their PCK of the region.
4. **Representation of the Region:** Ensuring a broad representation of producers was a consistent theme. This inclusive approach made certain that educators received a holistic view of the region, encompassing both large and small producers. Such diversity fosters a more comprehensive PCK, enabling educators to impart a nuanced understanding of the region's wines.

   Furthermore, in regions with diverse grape varieties, a focus was also spent on conveying the importance of the lesser-known grape varieties.

[22] Wines from Spain is overseen by the governmental department for trade: Instituto Español de Comercio Exterior (ICEX) - the Spanish Institute for Foreign Trade.

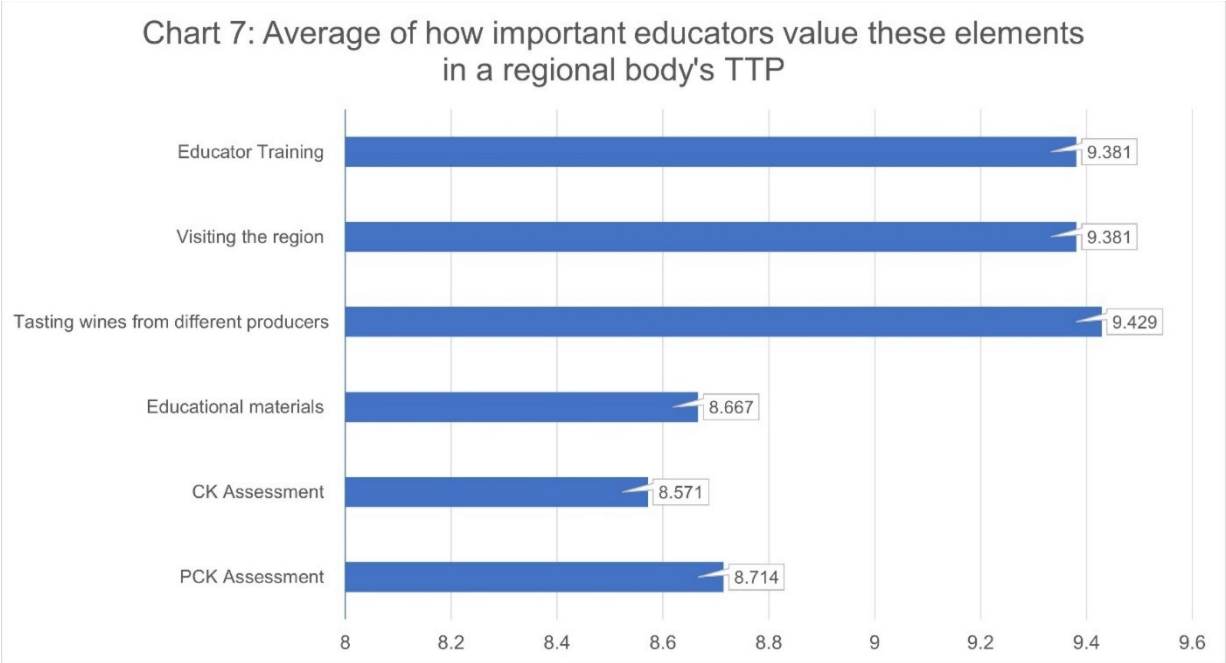
5. **Form of assessment:** Each TTP incorporated some form of assessment to gauge the efficacy of the training and the preparedness of the educators. For instance, some included a multiple-choice examination, while others asked candidates to submit an essay after the completion of the course. While the exact nature and rigour of these assessments varied, they generally aimed to ensure that educators could convey both the technical and cultural aspects of the wine region.

5.3.3 Analysis of regional bodies' TTP structures informed by educator perspectives

Data was collected from the four focus groups, in which a portion of the discussion was allocated to discussing participants' regional wine body experience. These discussions provided a route to analyse the structural themes that emerged through the regional body interviews.

In the post-focus-group survey, of the 21 educators who responded, 16 (ca.76%) had completed a regional wine body's TTP, and 5 (ca.24%) had not.

In the post-focus-group survey, educators were asked to rate the importance of regional body TTP components from 1 being not at all important to 10 being exceptionally important. Chart 7 shows the average score for these elements.



To provide more analytical detail, table 20 shows the median and standard deviation for this data.

Table 20: Median and standard deviation of elements to include in a regional body's TTP

	Educator Training	Visiting the region	Tasting wines from different producers	Educational materials	CK Assessment	PCK Assessment
Median	10	10	10	9	9	9
Standard deviation	0.805	1.071	1.363	1.653	1.434	1.309

As the data indicates, the standard deviation for educator training is SD=0.805. This relatively low standard deviation suggests that the values are tightly clustered around the mean (9.381), reinforcing the representativeness of this value. The high rating of educator training suggests a strong appetite by educators to further their pedagogical practice.

Analysing the data via regions gives a more detailed picture. Tables 21 and 22 show the median and standard deviation of these elements broken down by region.

Table 21: Median of elements to include in a regional body's TTP by region

	Educator Training	Visiting the region	Tasting wines from different producers	Educational materials	CK Assessment	PCK Assessment
AMER	9.5	9	10	10	8	10
EMEA	10	10	10	9	9	9
APAC	10	10	10	9	8.5	8

Table 22: Standard deviation of elements to include in a regional body's TTP by region

	The standard deviation					
	Educator Training	Visiting the region	Tasting wines from different producers	Educational materials	CK Assessment	PCK Assessment
AMER	0.957	1.915	3.000	0.500	1.500	0.500
EMEA	0.866	0.882	0.441	1.424	1.000	1.394
APAC	0.756	0.518	0.756	2.121	1.832	1.246

Given the small number of participants representing each region, a broader tolerance can be accorded to the observed standard deviations. Nevertheless, two regions exhibit particularly notable variances in opinions: educational materials for APAC (SD ≈ 2.121) and tasting different wines for AMER (SD = 3.000). Although the standard deviations for both regions are relatively large, the medians stand at 9 and 10, respectively. This suggests that the limited sample size may have disproportionately amplified the influence of a few outliers.

Analysing this data with reference to the free-response data from the survey and an analysis of the focus groups' discussions shows that both experiences and educational materials are vital structural components to a regional body's success.

In the survey, educators were asked to elaborate on why they thought educational training was an important component of a regional wine body's TTP. They were asked to provide "anything they think should or should not be covered in a regional body TTP" with reference to educator training. No options were given. Table 23 lists the tertiary-ordered themes that were mentioned more than three times by the 21 respondents.

Table 23: Tertiary-ordered themes mentioned by respondents

Theme	Number of mentions
Educational materials	8
Adapting to audience	7
Pedagogical skills	7
Classroom engagement	6

This survey data is reinforced by the focus groups. When discussing regional wine body TTPs, the following tertiary themes emerged in all four focus groups as to what would be desirable.

Table 24: Tertiary-ordered themes appearing in focus group discussions

Theme	Number of mentions
Desire for better educational materials	11
Visiting region	6
Tasting different wines	6
Pedagogical skills	5

When educators were asked to elaborate in the focus group on the type of educational content they desired, two elements were emphasised in relation to the structure of regional bodies' TTPs.

5.3.3.1 Accuracy of information

Educators expressed their concern about the type of CK being taught. One educator stated they were "always wary of the level of PR spin in these courses. You expect a region to be proud, but this can be at the expense of usable facts." This suggests that regional bodies should ensure that their content knowledge is as accurate and objective as possible.

Table 25 highlights the most common types of CK educators wished to see covered in regional body TTPs. This data is taken from the free response section of the post-

focus-group survey. Based on this survey, these themes should be the basis of any regional wine body's educational material output.

Table 25: Most frequent themes of CK that regional body's TTP should include

Theme	Number of mentions
Local food and wine pairing	4
Statistical commercial data	4
History of the region	3
Viticulture practices	3
Winemaking practices	3
Comparison of styles against global competitors	2

5.3.3.2 Amount of information

Educators voiced concerns about the volume of information presented at regional wine body's TTPs, leading to information overload. This could result in key details being forgotten soon after the training concludes. One educator summed up the sentiment heard across all four focus groups:

> *I realised within you know, a short time, most of that stuff had literally kind of fallen out. It was intense, it was great. And then it was gone. And then I'd taken some notes and some of my notes I can read, but not many of them. And I've recorded some of it, so I could kind of make out. But really, it was not an effective method of learning whether there needs to be some follow up to reinforce that.*

This suggests two key points concerning the structure of regional bodies' TTPs.

Firstly, educators feel that regional wine bodies include too much information. Having too many points throughout the TTP means it is difficult for participants to understand where the emphasis is, and therefore, like the educator above, they forget key points.

Secondly, educators highlighted the frustration of losing contact with the region after the TTP. Educators praised the Bordeaux programme for having a continual cycle of renewal, ensuring that educators felt connected and up to date. Those bodies that do not have this sort of programme were limited by resources.

5.3.4 Current picture of micro-teaching in regional body TTPs

Except for Rioja, who include a module on teaching technique as part of its online preparation course, pedagogical practices are not a common feature in any of the interviewed regional bodies. Reflective micro-teaching is not a prevalent feature in the interviewed TTPs. Nevertheless, all interviewees expressed interest in the concept, recognising its potential to refine the pedagogical skills of educators further, thus strengthening their PCK of the region. During the interviews, several barriers surfaced organically as to why micro-teaching was not involved. These were found to be common among multiple regional bodies.

Table 26: Most common barriers to include micro-teaching

Reason	Frequency (out of 5)
Limited timing in the programme	5
Lack of resources	4
Group size	4
Unsure of its value	3
Increase cost	3

As table 26 shows, timing is the most common issue for preventing the inclusion of micro-teaching into a TTP. Micro-teaching could extend a TTP by up to a day, which increases the costs and time of participants or would mean replacing a tasting or winery visit with this input.

Second to this is a potential lack of resources. Given the small teams that run these programmes, four of the regions felt they would struggle to be able to resource this activity to make it most effective for the participants.

Of the regional bodies interviewed, the IVDP most closely embraced the concept of micro-teaching, requiring participants to give a two-minute presentation on a specific bottle of Port selected by the regional body. However, this exercise's primary purpose is to assess the participant's content knowledge, ensuring, for instance, that they correctly identify the legal minimum ageing requirements or grape varieties used within a chosen wine. Furthermore, unlike micro-teaching, this is not presented in front of their peers, meaning no feedback is provided by the other participants.

Despite not having micro-teaching in place, the interviewed bodies did have a library of educator resources they have developed. These materials show a commitment to improving educator standards. However, the development of these materials needs to be framed within the educator perspectives previously mentioned.

5.3.5 Analysis of micro-teaching potential in regional bodies

For a regional body to include reflective micro-teaching, there must be both (1) the willingness and resources in place for the region to do so and (2) a demand from educators for this type of activity. As 5.3.2 makes clear, educators favour a regional body that has some emphasis on educator training; therefore, there already is a demand for this type of training to be incorporated into the regional bodies' TTPs. Furthermore, as shown in 5.2, micro-teaching has the potential to increase an educator's PCK.

As discussed in 5.3.4, micro-teaching does not exist within any interviewed regional body. The main reasons were time, costs and expertise. Micro-teaching involves little overhead outside of room rental and, if there is a tasting, glass hire and wine samples — neither of which are generally expensive for regional bodies. This leaves the issue of timing and expertise.

In order to integrate micro-teaching into the TTP, either the length of the programme would need to be expanded, or existing elements need to be replaced. Furthermore, either an in-house education specialist or external consultant would need to be brought in to maintain the educational rigour of the programme, as most of these programmes are run by marketing rather than educational specialists.

As educators make clear in discussions, there is already the belief that many regional bodies' TTPs include too much information and overload the course with tastings. Restructuring the programme to remove some trips or tastings may provide a space to incorporate micro-teaching into their programmes.

Indeed, two of the interviewed programmes have already taken on board the feedback from educators and cut down on the number of tastings, dinners and seminars. One interviewee mentioned how after "these never-ending lunches and tastings […] You're drunk and you can't do anything else." To maximise time, they cut down the number of wines shown at lunch, facing some bewilderment from producers, but as a result, "the difference was huge. […] We could use the afternoons."

This suggests that a restructuring of the programme is possible and that the time created could be used to explore the option of incorporating micro-teaching and thus contribute to the development of wine educators' PCK.

6 Conclusions and recommendations

This paper framed wine educators' teaching knowledge and skills within the framework of PCK. By doing so, the general level of wine educators' PCK revealed itself, as well as the value they place on it. Triangulating this with the efficacy of micro-teaching and the aims of regional wine bodies, several recommendations can be made for the development of wine educator training.

Throughout the focus groups, interviews and the micro-teaching experiment, educators stressed the importance of having a high level of content knowledge (CK). A strong CK base provides the foundation upon which educators can develop their PCK, echoing findings in the academic literature.

Although most educators were unfamiliar with the term PCK, they were familiar with how to use it, providing rich examples of PCK in action. The research showed that while educators value increased CK about wine, they equally value the benefits of increased PCK. Educators' desire to seek out improved pedagogical practices highlights the value they put into PCK development.

Wine educational bodies should prioritise continuous PCK development in their training regimes. Offering workshops and resources centred around enhancing PCK could be instrumental in refining wine educators' teaching practices. Furthermore, sharing best practices and creating platforms for educators to discuss their PCK experiences collaboratively can serve as invaluable feedback loops, continuously improving the quality and depth of wine education on offer.

It is vital to note that this PCK development should be balanced with continual high-quality CK development, which educators still value. This content should be reliable, robust, and reflective of the latest developments in the wine industry.

One method to improve PCK is through micro-teaching. The findings in this paper echoed research in other fields that condensed teaching practice and feedback can dramatically increase educators' PCK. Given the value that educators put into increasing their level of PCK as well as the efficacy of micro-teaching, wine-focused educational institutions with a TTP should consider incorporating this into their programmes.

Given that regional bodies' TTPs sit within marketing departments, there is a danger of prioritising promotional messaging over educational best practices. However, micro-teaching can be beneficial to both educators and regional bodies. Educators acquire essential teaching experience and skills in discussing a region. At the same time, regional bodies could effectively oversee the quality of their educators, ensuring that they are able to communicate about the region effectively.

To ensure micro-teaching is successfully integrated into their TTP, regional bodies could engage an in-house education specialist or consult with external experts to review and refine their programmes. Such a specialist could create a pilot programme to gauge the feasibility, effectiveness, and potential challenges that might arise from such a programme.

Despite the issues involved in incorporating micro-teaching into a regional body's TTP, doing so could improve the educator experience with the region, the clarity of a region's messaging, and indeed have the knock-on effect of developing effective wine educators with a high level of PCK.

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8 Appendices

8.1 Approved Research Paper Proposal

IMW Research Paper Proposal Submission Form			
Student ID	**27470**	**Date of submission**	**14 June 2023**
RPP Version No	**7c**	**Name of Advisor**	**Matthew Hemming MW**
Note: RPPs must be submitted via your Advisor to the IMW			
Proposed Title			
Developing effective wine educators: integrating the theory of pedagogical content knowledge into wine educator train-the-trainer programmes			
Research Questions: Define the subject of your Research Paper and specify the specific research questions you plan to pursue. (No more than 300 words)			

This paper evaluates how regional wine bodies can incorporate the academic theory of Pedagogical Content Knowledge (PCK) into their train-the-trainer programmes (TTPs).

Train-the-trainer programmes (TTPs) are used in various fields to prepare educators to teach their particular subjects. In the wine world, TTPs are used by wine education bodies (such as WSET) and regional wine bodies such as Bordeaux, Porto, and Wines of Rioja. However, research has yet to evaluate these wine-focused programmes through an academic lens.

The academic Lee Shulman (1986) proposed three types of knowledge required to be a successful teacher: (1) knowledge of one's subject, content knowledge; (2) knowledge of how to teach in general, pedagogical knowledge; and (3) knowledge of how to teach a particular subject, pedagogical content knowledge (PCK). PCK is "the knowledge about transforming content into a teachable form" (Mazibe, Coetzee, and Gaigher 2018). To date, no academic research evaluates wine educators' PCK.

This raises the first RQ:

RQ1. To what extent do wine educators incorporate PCK into their teaching practices, and how do they perceive the benefits of this?

Outside of wine, PCK is incorporated into many TTPs.[1] There are many subject-specific ways in which TTPs can be used to increase educators' PCK; however, Cochran (1993) provides a PCK tool that cuts across all subject streams: reflective micro-teaching.[2] This is when pre-service educators deliver short

[1] See Berry, Friedrichsen and Loughran 2015; Tonna and Bugeja 2018

[2] He expands upon this by saying that the "construction of pedagogical content knowledge results from multiple opportunities to teach, to observe and to reflect on one's own teaching and that of others in the content area" (Cochran 1993, 269).

lessons to their peers, provide self-feedback and receive feedback from peers. This process has been shown to develop educators' PCK.[3]

Using reflective micro-teaching as a lens of PCK, this paper will ask:

RQ2. To what extent do wine educators' PCK increase through reflective micro-teaching?
RQ3. What is the structure of regional bodies' TTPs, and to what extent is reflective micro-teaching used or could be used to increase educator PCK of the region?

Through these questions recommendations can be made for wine regions considering implementing a TTP.

Background and Context: Explain what is currently known about the topic and address why this topic requires/offers opportunities for further research. (No more than 300 words)

Shulman (1986) introduced the concept of pedagogical content knowledge (PCK), which provides a theoretical framework to address how to teach a particular subject.

Educators with a high level of PCK adapt the subject matter to align with the students and learning environment, superseding static, universal methodologies employed by those with a lower level of PCK. For example, suppose an educator is teaching how the soils of left-bank Bordeaux allow for the ripening of Cabernet Sauvignon. In this case, they might employ several strategies, such as diagrams, realia, or scaffolding.[4] An educator with a high level of PCK would know how to react and adapt to the students in the class alongside other external or internal factors,[5] while an educator with a lower level of PCK would apply the same technique irrespective of any other factors.

PCK is now widely seen as crucial for effective educators, and indeed "the development of PCK is an important goal to focus on in professional development programs" such as TTPs (Van Driel and Berry 2012).[6]

Various methods can be utilised within a TTP to enhance educators' PCK. Most of these are tailored to specific subject areas (for instance, explaining scientific concepts to young children).[7] One common strategy that appears in the literature, cutting across subject boundaries, is the incorporation of 'clinical practice' – reflective micro-teaching sessions, where preservice educators deliver small lessons to other preservice teachers, who act as students.[8] This is followed by self-reflection, peer feedback and group discussion. These sessions have been demonstrated to increase the PCK of prospective educators.[9]

Despite research in many academic fields, no research has been conducted explicitly to evaluate wine educators' PCK nor methods of improving it via a TTP.

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[3] For a recent experiment of this, see Boz and Belge-Can (2020).

[4] These are three examples of pedagogical knowledge that preservice teachers generally learn on TTPs. Realia is the catchall term for 'real things'; in this example, an educator brings in gravel and demonstrates its free-draining properties with water. Scaffolding is an instructional technique to guide students to stronger independence through specific questioning. For further information on such instructional designs, see Joyce, Weil, and Calhoun (2015).

[5] For example, the environment the class is taking place or the internal motivations of the students.

[6] This sentiment is echoed throughout the PCK literature. See Magnusson, Krajcik, and Borko (1999); Rohaan, Taconis, and Jochems (2009); Shulman (1987)

[7] For example Mazibe, Coetzee, and Gaigher (2018) use the PCK notion of Content Representation (CoRe) to explore and measure physical science teachers ability to teach graphs of motion. This builds on the work of Loughran, Berry, and Mulhall (2012).

[8] This is expressed theoretically in Cochran (1993). An example of its application is Etkina (2010).

[9] For a recent example see Boz and Belge-Can (2020).

This research positions, for the first time, wine educator training within the current academic literature of teacher training. By doing so, this research will inform the development of wine-focused TTPs for regional wine bodies.

Sources: List key background sources (previous research, articles, books, official documents etc.) that will help to form your literature review. Note these should be listed as full references. (No more than 200 words)

Regional wine bodies:

- REDACTED
- REDACTED
- CIVB educator team
- Certified Port Educator team as part of the IVDP
- Peter Arijis, Education and Projects Manager at Wines of Rioja
- Elisa Errea, writer and editor of Wines of Spain
- Wine educators (taken from Association of Wine Educators; WSET course providers; researchers' professional network)

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Research Methodology: Detail how you will identify and gather the material or information necessary to answer the research question(s) and discuss what techniques you will use to analyse this information. (No more than 800 words)

RQ1: To what extent do wine educators incorporate PCK into their teaching practices, and how do they perceive the benefits of this?

Method: 2 in-person (1 of which is the pilot) and 2 online focus groups of wine educators.

In line with Krueger and Casey (2015) and Fusch and Ness (2015), to reach saturation, three focus groups (each with 5 - 10 participants) will be carried out in addition to a single pilot. Two online focus groups and two in-person ones (including the pilot) will capture a broad spectrum of educators.

Screening: Wine educators will be selected who meet the following requirements:

- Have Wine Educator as their main job;
- Hold a high-level wine qualification (WSET Diploma, MW, MS, Advanced Sommelier);

These requirements are typical of the requirements for many train-the-trainer programmes (TTPs) and, therefore, will produce a cohort of educators who will provide the most meaningful results. Participants will be recruited through the researcher’s professional network and the Association of Wine Educators (AWE).

The participants will be chosen to show a range of ages and regions, with an attempt for an equal split of genders.

Each focus group will discuss the following:

- Introducing the concept of PCK.
- How do wine educators rate their level of PCK, and how do they use it in the classroom?
- To what extent was PCK something they learnt on the job or during their wine educator training?
- What is their experience with wine-focused TTPs and regional wine bodies’ TTPs?
- What is their experience of reflective micro-teaching?
- To what extent would they see the benefit of PCK if/when taught in a regional wine body TTP?

The focus groups will be recorded, with summary key points transcribed. Following Krueger and Casey (2015), the data will be coded and analysed using the Gioia method (Gioia, Corley, and Hamilton 2013).

First-order concepts will be coded, combined, and recoded to second-order themes, eventually creating aggregate dimensions that will allow for a more robust analysis (ibid.).

RQ 2: To what extent do wine educators' PCK increase through reflective micro-teaching?

Methodology: quasi-experimental single-group pretest-posttest design of reflective micro-teaching with semi-structured 1-2-1 interviews

A group of 7 wine educators will be recruited.[10] These educators will (like in RQ1) be wine educators with a high level of knowledge, but this time will come from a diverse background of TTP experience. This means the educators will have experience with different TTPs, or no TTPs at all. While some may have attended the same TTP, not all candidates will have attended the same one (i.e., not all candidates will have attended the WSET TTP or the Wines or Rioja TTP).

These candidates will be asked to develop and deliver a 15-minute in-person micro-teaching lesson on a different wine-related topic in which they are an expert. It will be in person since most regional wine bodies are in person. Given the researcher's location, the micro-teaching will be conducted in London.

A single in-person group of six wine educators was chosen for its balance of efficiency and effectiveness, allowing for a broad range of PCK to be explored while ensuring a sufficiently intimate setting for adequate reflection, feedback and discussion.

To evaluate the educators' PCK before and after the intervention, recorded 1-2-1 semi-structured interviews will be employed. Semi-structured interviews were chosen as they offer a blend of structure and flexibility, allowing the researcher to delve deeper into the educators' understanding and application of PCK while allowing for unanticipated responses that may provide valuable insights.

Pre-Intervention: Before the micro-teaching, each educator will participate in a recorded semi-structured 1-2-1 interview to explain their approach to teaching their topic and how they would approach the other five topics. This provides a baseline understanding of their PCK of these topics before the reflective micro-teaching.

Intervention: Each educator will deliver their micro-teaching lesson (with the other five acting as students), followed by self-reflection and peer feedback. The micro-teaching lessons and post-teaching discussions will be recorded.

Post-Intervention: After completing all micro-teaching, a second round of semi-structured 1-2-1 interviews will be conducted. Educators will be asked how they might change the teaching of their topic and how, after seeing the other five educators, they would approach teaching those topics differently in light of the micro-teaching.

The pre-and post-intervention measures will be compared to gauge the extent to which reflective micro-teaching can enhance educator PCK. The single-group pretest-posttest design provides a practical method to evaluate the intervention's impact within the wine education setting, offering internally valid insights into improving wine educators' PCK through reflective micro-teaching.

RQ3: What is the structure of regional bodies' TTPs, and to what extent is reflective micro-teaching used or could be used to increase educator PCK of the region?

Method: Qualitative analysis through semi-structured interviews with representatives from regional wine bodies who work closely with their TTP and educational material

[10] Seven educators will be recruited allowing for the possibility that one might drop out.

Several key considerations have guided the selection of the regional bodies of CIVB, IVDP, Sherry, Organisation A, Rioja, and Wines of Spain.[11]

Firstly, these wine bodies represent a mix of established TTPs (for example, CIVB, IVDP, Sherry and Organisation A) and newly formed TTPs (Wines of Spain). This allows for a comparison of mature and nascent programmes, providing a broader understanding of TTP structure and development over time.

Secondly, these wine bodies represent different regions and styles, providing a diversity of contexts, regulations, and traditions.

Finally, several selected TTPs exist within Spain, one of the world's largest wine producers. Analysing these Spanish regional bodies' TTPs will provide insight into how such programmes can be designed and executed within a single national context that nonetheless encompasses a high degree of internal diversity.

The qualitative approach adopted in this study allows for a deep and nuanced understanding of the structure of these TTPs, and how reflective micro-teaching is or could be used to increase educator PCK of the region. The interviews investigate the aims of each regional body, how their educational materials and programmes align with their desired outcomes, and the perceived advantages and disadvantages of having a TTP.

These interviews will help provide a comprehensive picture of the current practices and future potential of using reflective micro-teaching within the wine industry's TTP.

Due to sensitivities, much of this, including the exact regions named, may need to be redacted in the final version.

Potential to Contribute to the Body of Knowledge on Wine: Explain how this Research Paper will add to the current body of knowledge on this subject. (No more than 150 words)

This research paper offers a novel exploration of wine educator training through the academic lens of Pedagogical Content Knowledge (PCK), specifically examining the role of reflective micro-teaching in enhancing this vital instructional skill set.

Investigating the existing and potential application of reflective micro-teaching within regional wine bodies' Train-the-Trainer Programmes (TTPs), this research empirically assesses the structures and strategies of regional wine bodies' TTPs.

This paper contributes unique insights towards enhancing wine education practices by delving into the efficacy of reflective micro-teaching to elevate wine educators' PCK. The findings will provide a valuable guide for regional wine bodies seeking to optimise their TTPs, ultimately cultivating more proficient wine educators. In short, this study bridges the gap between learning theories and wine education; in so doing, it situates wine educator training within the broader academic discourse.

Proposed Time Schedule/Programme: This section should lay out the time schedule for the research, analysis and write-up of the Research Paper and should indicate approximate dates with key deliverables. *Dates of submission to both Advisors and the IMW must be those specified by the IMW.*

[11] Please see the reference section of this RPP for a list of names and titles of those being interviewed.

Mid-June: Approval

March-May: literature review ongoing

May - June: develop focus group questions / interview regional wine bodies

Early June: Pilot focus group / recruit wine educators for micro-teaching

June-August: Run focus groups / run micro-teaching session

August-September: analyse data

June – October: write RP

October: submit the first draft

8.2 Interview questions

8.2.1 Focus group interview questions.

1. What examples of effective teaching techniques do you have?
2. How did you create these techniques?
3. Do you think PCK should be taught as part of teacher training? Why?
4. How did you learn to teach?
5. Has anyone done a regional wine body TTP?
6. What were your experiences of that?
7. Do you have experience with micro-teaching?
8. What were your experiences of that?

8.2.2 Micro-teaching 1-2-1 pretest interview quetions

1. Why did you choose your topic?
2. How did you prepare this topic?
3. What is your teaching experience like?

8.2.3 Micro-teaching 1-2-1 posttest interview questions

1. How did you feel your session went today?
2. Having seen the others and receiving feedback how would you change this again?
3. What are your key takeaway points?
4. Did you feel that this exercise was useful? Why / why not?
5. Do you feel that you could benefit from doing more such sessions? Why/ why not?

8.2.4 Regional wine body interview questions

1. Could you start, please by giving an overview of [name of programme] . When was it created and why?
2. What is the structure of the course?
3. Are there any assessments and if so, what do they look like? Why did you choose that type of assessment?
4. Who are the candidates that come onto the course?
5. How do you recruit them/ choose them?
6. How do you measure the success of the programme?
7. What are the challenges you had/ still have?
8. What are your plans for the programme?
9. Do you have educators practice teaching as part of the programme?
10. Would that be something you would want to integrate? Why? Why not?

8.3 Surveys

8.3.1 Post-focus-group survey

Created in Google Forms.

Demographic data

This data is to help provide a picture of the people who participated in the focus groups. If you choose not to answer, please select or type *prefer not to say*.

In which country are you based?*

Your answer

In which country/ies do you teach?*

Your answer

For how many years have you been teaching wine courses?

Your answer

How do you identify?*

Female
Male
Non-binary
Prefer not to say
Other:

Content and pedagogical knowledge
Please rate your level of knowledge or confidence to the points below.

Your general wine knowledge *

Very low level of knowledge Very high level of knowledge

1 2 3 4 5 6 7 8 9 10

Your ability to teach a general wine course*

Very low level of confidence Very high level of confidence

1 2 3 4 5 6 7 8 9 10

To what extent do you think educator training is important for wine education?*

Not at all necessary Absolutely necessary

1 2 3 4 5 6 7 8 9 10

(optional) If you answered a 5 or above, what things do you think should be covered/taught in such programmes?

Your answer

Regional wine body educator programmes
Have you completed a regional wine body TTP?*

yes
no

In deciding on attending a regional wine body train-the-trainer programme (such as Wines of Rioja Certified Educator course), please rate how important each factor is.

Visiting the region*

Not at all important Very important

1 2 3 4 5 6 7 8 9 10

Tasting wines from a range of producers*

Not at all important Very important

1 2 3 4 5 6 7 8 9 10

Being provided with educational materials to use in your classes*

Not at all important Very important

1 2 3 4 5 6 7 8 9 10

Being assessed during the course on your knowledge
(e.g., multiple choice question)
*

Not at all important Very important

1 2 3 4 5 6 7 8 9 10

Being assessed during the course on your ability to talk about the region effectively*

Not at all important Very important

1 2 3 4 5 6 7 8 9 10

Is there anything that you think should be (or should not be) covered in such regional educator programmes?

Your answer

Is there anything that the focus group sparked that you would like to add here? (feel free to leave blank if not)

8.3.2 Micro-teaching pretest survey

Created in Google Forms

Content Knowledge

On a scale of 1 to 10 how would you rate your level of knowledge in the following subjects? For example, a 10 would be that you feel you have a high level of knowledge about the subject, whereas a 1 would be that you have little to no knowledge about the topic.

The first question is about your level of confidence in general wine knowledge.

General wine knowledge *

Very low level of knowledge Very high level of knowledge

1 2 3 4 5 6 7 8 9 10

The History of Zinfandel *

Very low level of knowledge Very high level of knowledge

1 2 3 4 5 6 7 8 9 10

Morey-Saint-Denis*

Very low level of knowledge Very high level of knowledge

1 2 3 4 5 6 7 8 9 10

Xinomavro*

Very low level of knowledge Very high level of knowledge

1 2 3 4 5 6 7 8 9 10

Sherry *

Very low level of knowledge Very high level of knowledge

1 2 3 4 5 6 7 8 9 10

Turkish Wines*

Very low level of knowledge Very high level of knowledge

1 2 3 4 5 6 7 8 9 10

Nebbiolo and Piedmont *

Very low level of knowledge Very high level of knowledge

1 2 3 4 5 6 7 8 9 10

Cava*

Very low level of knowledge Very high level of knowledge

1 2 3 4 5 6 7 8 9 10

Teaching Skills

On a scale of 1 to 10 how would you rate your confidence level in **teaching** the following subjects? For example, 10 would mean you could teach that subject with only minimal preparation, whereas a 1 would mean that you would require considerable work in preparing to teach that subject.

The first question concerns your confidence in teaching wine topics in general.

Teaching about wine in general *

Not at all confident Extremely confident

1 2 3 4 5 6 7 8 9 10

Teaching the History of Zinfandel *

Not at all confident Extremely confident

1 2 3 4 5 6 7 8 9 10

Teaching Morey-Saint-Denis*

Not at all confident Extremely confident

1 2 3 4 5 6 7 8 9 10

Teaching Xinomavro*

Not at all confident Extremely confident

1 2 3 4 5 6 7 8 9 10

Teaching Sherry *

Not at all confident Extremely confident

1 2 3 4 5 6 7 8 9 10

Teaching Turkish Wines*

Not at all confident Extremely confident

1 2 3 4 5 6 7 8 9 10

Teaching Nebbiolo and Piedmont *

Not at all confident Extremely confident

1 2 3 4 5 6 7 8 9 10

Teaching Cava*

Not at all confident Extremely confident

1 2 3 4 5 6 7 8 9 10

8.3.3 Posttest micro-session survey

Created in Google Forms

Content Knowledge

On a scale of 1 to 10 how would you rate your confidence levels on the subjects after seeing them being presented? While we realise you only watched a small section on this topic, if you felt that you learnt something about the topic please give it a score above 5.

The first question is about your level of confidence in general wine knowledge.

General wine knowledge *

Very low level of knowledge Very high level of knowledge

1 2 3 4 5 6 7 8 9 10

The History of Zinfandel *

Very low level of knowledge Very high level of knowledge

1 2 3 4 5 6 7 8 9 10

Morey-Saint-Denis*

Very low level of knowledge Very high level of knowledge

1 2 3 4 5 6 7 8 9 10

Xinomavro*

Very low level of knowledge Very high level of knowledge

1 2 3 4 5 6 7 8 9 10

Sherry *

Very low level of knowledge Very high level of knowledge

1 2 3 4 5 6 7 8 9 10

Turkish Wines*

Very low level of knowledge Very high level of knowledge

1 2 3 4 5 6 7 8 9 10

Nebbiolo and Piedmont *

Very low level of knowledge Very high level of knowledge

1 2 3 4 5 6 7 8 9 10

Cava*

Very low level of knowledge Very high level of knowledge

1 2 3 4 5 6 7 8 9 10

Teaching Skills

On a scale of 1 to 10 how would you rate your confidence level in **teaching** the following subjects after seeing them? For example, 10 would mean you could teach that subject with only minimal preparation, whereas a 1 would mean that you would require considerable work in preparing to teach that subject.

The first question concerns your confidence in teaching wine topics in general.

Teaching about wine in general *

Not at all confident Extremely confident

1 2 3 4 5 6 7 8 9 10

Teaching the History of Zinfandel *

Not at all confident Extremely confident

1 2 3 4 5 6 7 8 9 10

Teaching Morey-Saint-Denis*

Not at all confident Extremely confident

1 2 3 4 5 6 7 8 9 10

Teaching Xinomavro*

Not at all confident Extremely confident

1 2 3 4 5 6 7 8 9 10

Teaching Sherry *

Not at all confident Extremely confident

1 2 3 4 5 6 7 8 9 10

Teaching Turkish Wines*

Not at all confident Extremely confident

1 2 3 4 5 6 7 8 9 10

Teaching Nebbiolo and Piedmont *

Not at all confident Extremely confident

1 2 3 4 5 6 7 8 9 10

Teaching Cava*

Not at all confident Extremely confident

1 2 3 4 5 6 7 8 9 10

8.4 Appendix A, review of wine educational programmes

Programme	Brief Description	Category
Wine & Spirit Education Trust (WSET)	The WSET is a global wine education organisation that offers courses from beginner to advanced levels.	General (with various levels)
Wine Scholar Guild (WSG)	Wine Scholar Guild (WSG) is a wine education school that offers courses from beginner to advanced levels, with a focus on the wines of France, Italy, and Spain.	General (with specific subcategories)
Court of Master Sommeliers (CMS)	The CMS is a professional association for sommeliers that offers courses leading to the Master Sommelier Diploma.	General (with various levels and professional focus)
Society of Wine Educators (SWE)	The SWE runs a series of educational programmes, including an annual educational confrence.	General
University of California, Davis	The University of California, Davis offers several academic specific undergraduate and graduate degrees in viticulture.	Academic
Geisenheim University	Geisenheim University offers many different types of degrees in viticulture and winemaking.	Academic
Organisation Internationale de la Vigne et du Vin (OIV)	The OIV MSc in Wine Management is a wine business program offered by the OIV.	Academic
Masters of Wine	The Masters of Wine is a wine qualification offered by the Institute of Masters of Wine.	General
University of Bordeaux	Master programmes in viticulture and oenology.	Academic
University of Adelaide	Programmes in wine marketing, wine business as well as in viticulture and winemaking.	Academic
Culinary Institute of America (CIA)	Focus on Wine and Beverage Management with various academic degrees.	Academic

8.5 Appendix B, Bordeaux CoRe

This CoRe is designed for students at WSET Level 2 equivalency.	**A: Cabernet Sauvignon is a late ripening grape variety**	**B: The climate of Bordeaux is generally not suited for Cabernet Sauvignon**
What you intend the students to learn about this idea.	Cabernet Sauvignon requires a lot of heat and sun to ripen fully.	The climate of Bordeaux is moderate and very rainy; therefore, the sunlight and heat are limited. Furthermore, rains can further cool down the soils which slows down ripening. All of this points to a difficult climate for Cabernet Sauvignon to ripen.
Why is it important for students to know this.	Understanding this property of Cabernet Sauvignon means students are able to grasp the requirements needed for it to ripen successfully.	Understanding the climate allows students to understand the struggles for Cabernet Sauvignon as they also have grasped its requirements.
What else <u>you</u> know about this idea (that you do not intend students to know yet).	Other viticultural characteristics such as smaller berries, susceptibility to fungal diseases etc. Students would not need to know about the complex process of ripening in great detail.	The climate is moderate maritime, which accounts for the amount of rain and cloud cover during the growing season.
Difficulties/ limitations connected with teaching this idea.	While sunlight and heat is vital they are not the only features which can influence a grapes ripening process.	Students may jump to qualifying a vintage as bad or good based solely on rainfall, neglecting to take into account the timing of the rainfall alongside other factors.
Knowledge about students' thinking which influences your teaching of this idea.	Students have seen a late ripening grape variety before so should be able to apply this knowledge to this variety. They also understand the basics of sugar accumulation as a grape ripens.	Students have seen a moderate climate before, and they understand how rain can effect ripening.
Other factors that influence your teaching of this idea.	Cabernet Sauvignon is one of the several permitted grapes allowed in Bordeaux. Not all these grapes in Bordeaux share the same properties.	Moderate climates are not necessarily always maritime; so students need to be disabused of this notion.

This CoRe is designed for students at WSET Level 2 equivalency.	**C: The soils of the left bank allow for the ripening of Cabernet Sauvignon**
What you intend the students to learn about this idea.	Gravel is large soil that means that water is not retained. The water that flows out means that despite the climate the soils are drier than expected. The drier soils mean that they retain more heat.
Why is it important for students to know this.	Understanding the soils means students can grasp how the property of gravel is able to retain heat and help Cabernet Sauvignon to ripen fully.
What else <u>you</u> know about this idea (that you do not intend students to know yet).	This is a slight oversimplification of the role of soil, neglecting the subsoils and nutrients.
Difficulties/ limitations connected with teaching this idea.	Students may believe that gravel is always best, removing the context of grape and climate.
Knowledge about students' thinking which influences your teaching of this idea.	Students will know what gravel is from their everyday life, but may not have thought about it's properties when it comes to drainage and therefore heat retention.
Other factors that influence your teaching of this idea.	A key factor is linking how the drainage of gravel allows it to retain heat. The retention of heat and drainage are not independent. And they follow a logical order of drainage to heat not the other way around.

This CoRe is designed for students at WSET Level 2 equivalency.	**A: Cabernet Sauvignon is a late ripening grape variety**	**B: The climate of Bordeaux is generally not suited for Cabernet Sauvignon**
Teaching procedures (and particular reasons for using these to engage with this idea).	Using a flipchart, start with a basic drawing of the grape and elicit from students the properties Cabernet Sauvignon. Elicit from the students the climatic properties then required. State the climatic properties of Bordeaux and ask the students why this is not ideal for Cabernet Sauvignon. Introduce the concept of gravel and explain how water interacts with it. Explain how drier soils are warmer soils. Explain how this heat radiates back to the grape. **Extends to C**	
Specific ways of ascertaining students' understanding or confusion around this idea (include likely range of responses).	Describing a particular vintage (2015 v. 2013) and have students explain the challenges (or lack there of) for that vintage, and its concomitant effect on ripening. * "2015 had consistent heat aiding ripening, while 2013's cool, wet conditions challenged Cabernet Sauvignon grape maturity." * "Sunny 2015 produced full bodied Cabernet Sauvignon style wines because of the heat, whereas 2013's inconsistent weather resulted in more acidic expressions of Cabernet Sauvignon ." **Extends to C**	

This CoRe is designed for students at WSET Level 2 equivalency.	**C: The soils of the left bank allow for the ripening of Cabernet Sauvignon**
Teaching procedures (and particular reasons for using these to engage with this idea).	*see above*
Specific ways of ascertaining students' understanding or confusion around this idea (include likely range of responses).	*see above*

Figure 7 is the final slide of an animated PowerPoint deck representing the flipchart exercise explained above.

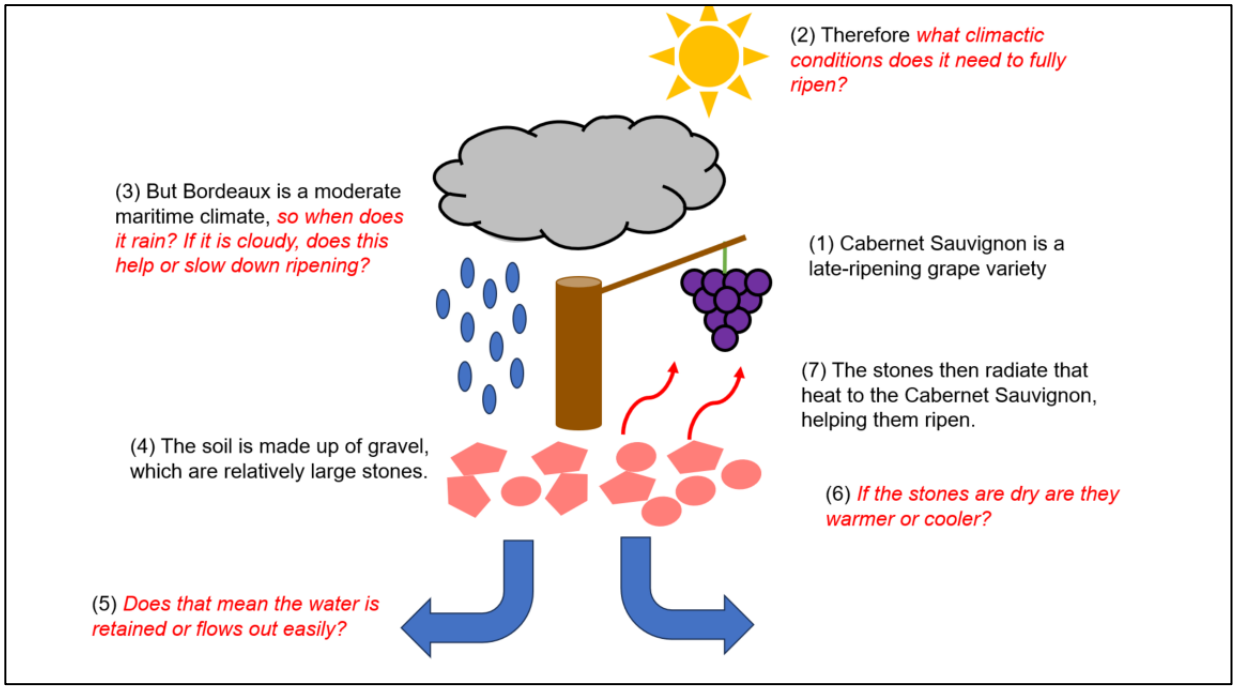


Figure 7: Final slide

8.6 Appendix C, Target students and conversion to WSET levels for micro-teaching experiment

Level	Description
WSET Level 1	A beginner level introduction to wine suitable for those starting a wine career or pursuing an interest in wine.
WSET Level 2	A beginner- to intermediate-level qualification exploring wines, suitable for industry professionals and wine enthusiasts.
WSET Level 3	For professionals working in the wine industry and for wine enthusiasts.
WSET Level 4	An expert-level qualification covering all aspects of wine.

s

Topic	Original target audience as chosen by participant	WSET equivalency
Nebbiolo	Advanced group	Level 3
Turkish wine	Intermediate group	Level 2
Cava legislation	Diploma students	Level 4
Sherry	Some interest in wine but not wine professionals	Level 2
Morey-St-Denis	Advanced group of wine professionals	Level 3
Xinomavro	Level 2 WSET	Level 2
History of Zinfandel	Mixed group of novices to MWs	Level 1- 4+ (mixed)