

Trends in LN-embedding practices at Waikato Institute of Technology (Wintec) in 2019

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Summary

In this report, we describe the trends in literacy-embedding practices of level-2 and level-3 tutors who worked in vocational contexts at Waikato Institute of Technology (Wintec), and who completed the New Zealand Certificate in Adult Literacy and Numeracy Education (NZCALNE[Voc]) in 2019. We analysed 19 observations, following constructivist grounded theory methodology (Charmaz, 2014), to produce 1302 descriptive labels that highlight literacy and numeracy practices integrated into tutors' teaching intentionally pursued in a collaborative and mentored training process. Of the initial 12 categories, we conflated the mapping of LN course demands and identifying learners' LN needs to arrive at a final 11. We then used these categories in an axial analysis (Saldaña, 2013), categorising the 1302 labels as binaries (i.e. if the label was related to the category, 1 was coded; if not 0 [zero]). The matrix of 14322 ratings of 1s and 0s was then analysed. We calculated the frequency of 1s by category. We argued that the axial analysis allowed us to develop a more holistic perspective which showed how the 1302 labels were configured in relation to the 11 categories of analysis. We concluded that the 11 categories represented key aspects of vocational teaching and training emphasising that LN-embedding practices have to be seamlessly integrated into general pedagogical approaches. A key construct for new tutors is to shape their understanding of seamlessly integrated versus bolted-on LN practices. Our recommendations remain within the whole-of-organisation perspective proposed in the 2017-2018 report (Greyling, 2019).

Introduction

The Wintec LN Policy 2018 (Revised) states that the LN-embedding team will report on the trends in LN-embedding practices at the institute. In earlier reports (Greyling and Ahmad, 2019a,b), we referred to LN-embedding practices as having to be "joined up" within a whole-of-organisation approach to our practices. In part, this report is intended to address this goal. We intend to show that this report is aimed at multiple levels of organisational functioning. To name a few, the report focuses on:

- compliance of Wintec academic staff with the requirements of Tertiary Education Commission (TEC) policies (TEC, 2009; 2015), as well as the strategic priority in the most recent Tertiary Education Strategy (2014-2019) that research-based and informed decision-making has to be applied in addressing learner needs in education.
- compliance with Wintec's LN Policy (Revised, 2018b).
- NZCALNE(Voc) training as work-integrated, preparing tutors for their learners' literacy and numeracy challenges.
- a triangulated qualitative account of key aspects of new tutors' practices, making explicit these training-related practices (Stake, 2008).
- tutor practices that may also be judged against their learners' LN assessment tool performance (Greyling, Ahmad and Wallace, 2020a and 2020b).
- the high-frequency categories as a set of prompts to be used in tutor training or even as a checklist of significant LN practices.

Research methods

We replicated the research methods outlined in the 2019 report (Greyling, 2019). These reports also refer back to institutional reports lodged in 2016 (Greyling and McKnight, 2016a, 2016b). In brief our approach involved the following steps:

- **Selecting the data:** We selected 19 observations¹ from the 21 produced, eliminating two observations where the format of the observation deviated from the agreed format.
- **Following constructivist grounded theory to code the texts:** Following constructivist grounded theory methods (Charmaz, 2014), the two academic staff members on the team produced 1302 descriptive labels that highlight specific literacy and numeracy practices intentionally pursued in a collaborative and mentored training process.
- **Identifying emergent categories:** In Excel, we sorted the so-produced labels, identifying 12 high-frequency categories.
- **Axial analysis and revisions:** While performing the axial analysis based on the initial 12 categories, we conflated the mapping of LN course demands and identifying learners' LN needs. We then used these categories in an axial analysis (Charmaz, 2014; Saldaña, 2013), categorising the 1302 labels as binaries (i.e. if the label was related to the category, 1 was coded; if not 0 [zero]). The matrix of 14322 ratings of 1s and 0s was then analysed. We calculated the frequency of 1s by category. We argued that the axial analysis allowed us to develop a more holistic perspective which showed how the 1302 labels were configured in relation to the 11 categories of analysis.
- **Excel & SPSS analyses:** The main focus of our analysis was the frequencies associated with the 11 categories and the labels that were clustered with them. We also performed a cluster analysis (CA) and a principal components analysis (PCA). We report very briefly on these findings (IBM Corp/SPSS, 2017; Field, 2014).
- **Triangulation:** All three authors were involved in the analytical phases of the process (Stake, 2008):
 - **Stage 1:** Each academic staff member analysed their students' classroom observations (analyst 1 = 9, analyst 2 = 10). These were passed on to the third member of the team for an axial analysis.
 - **Stage 2:** Each staff member was given the task and responsibility to review the written report and the data files.
- **The 11 higher-level categories** were the following:
 - C1: Deliberate proactive lesson planning and pre-teaching choices of teaching strategies, methods and techniques.
 - C2: The interactive accomplishment of lesson plans as intentional learning conversations.
 - C3: Deliberate teacher initiations to enact a lesson plan or initiation-response-evaluation sequences aimed at circumventing barriers in the interaction.
 - C4: Deliberate and explicit references to literacy and numeracy embedding.
 - C5: Prompting and encouraging teacher acts aimed at facilitating learner participation.

¹. The second and third authors teach on the New Zealand Certificate in Adult Literacy and Numeracy Education (Vocational). They conducted observations of candidates' classrooms as they tracked evidence for the successful completion of the programme.

- C6: Strategically embedded teacher explanations to ensure learners developed appropriate modes of informed vocational reasoning.
- C7: Teacher prompts to raise learner awareness of vocational constructs and actions in relation to training tasks and experiences.
- C8: Teacher acts deriving from or promoting workplace and/or cultural values.
- C9: Matching LN demands of a programme and the LN needs of learners.
- C10: Designing learning experiences to promote learner autonomy.
- C11: Designing authentic tasks.

Findings and discussion

We follow the same format as that of the 2019 report. The following headings are used to summarise and discuss the findings:

- Working definitions of the 11 categories
- Frequency data for the 11 categories
- Correlations among the categories
- Principal Components Analysis findings
- Cluster Analysis findings

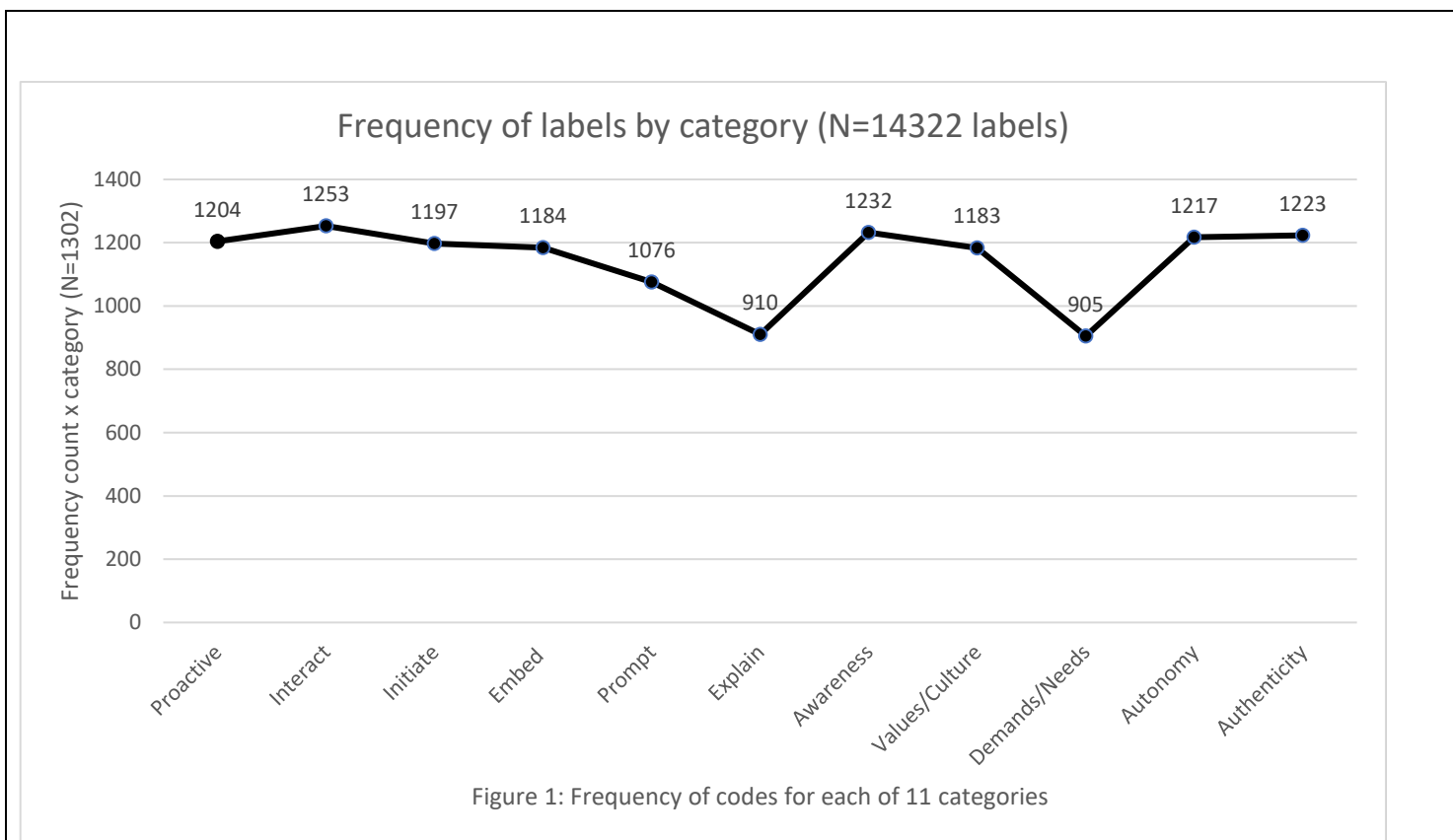
Our main focus is on the first two sets of findings. We refer very briefly to the correlational, PCA and CA findings. These analyses elaborate some of the findings that appear in listed format. PCA and CA findings were added so that we could remind ourselves that the discrete findings should be viewed as interconnected and interwoven. We note the relatedness of themes in the PCA and CA results reported later.

Working definitions of the 11 categories

For each category, 1302 judgements were made, either a 1 for a perceived link between a label and the category, or a 0 (zero) for the perceived absence of a link. We replicated the format we followed in the 2019 report on 2017-2018 practices (Greyling, 2019). Using participial constructions (*-ing form + X where x was a feature of the observed classroom action*), the two analysts who had observed their lessons generated labels for the actions, processes or experiences that they had described in the observations.² The third analyst then sorted the ing-labels to identify the 12 most frequently occurring categories. The latter categories were conflated to reduce the total to 11 when we realised that LN needs analyses and LN demands mirrored each other. To show how the labels were clustered in relation to the 11 categories, we performed an axial analysis (Charmaz, 2014; Saldaña, 2013). If a label was related to a category, it was assigned a 1, if not a 0 [zero].

The categories that were identified are listed below and shown in the bar chart in Figure 1 which indicates that the 1302 labels were related to the 11 categories based on 12584 positive judgements (the 1s in the binary analysis):

² . The analysts did not analyse each main clause of their classroom observation texts; rather, they systematically worked through the texts entering -ing labels as themes came up in their analysis of their texts. This is different from the 2019-report in which the analyst performed clause-by-clause analysis, sometimes generating multiple labels for the same clause. In the current analysis, some of the labels cover only front-of-mind impressions for multiple sentences, sometimes paragraphs of text.



- C1: Deliberate proactive lesson planning and pre-teaching choices of teaching strategies, methods and techniques
- C2: The interactive accomplishment of lesson plans as intentional learning conversations
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- C9: Matching LN demands of a programme and the LN needs of learners
- C10: Designing learning experiences to promote learner autonomy
- C11: Designing authentic tasks

The 11 working definitions and the five high frequency labels associated with them are outlined below:

Category 1: Planning lessons and teaching as proactive deliberate choices

This category refers to deliberate analysis and planning, mobilising all the resources, interactive options and experiences that may promote learning (Whittingham, 2019). However, proactively designed lessons and intended learning events are trumped by the interactive accomplishment of these plans as learning conversations (Ehlich, 1983; McHoul, 1979; Mehan, 1978). In the axial analysis, several labels that were related to the interactive process were also coded as important for the proactive planning category. Deliberate planning without deliberate implementation is meaningless. The top five labels for this category were the following:

- Designing and creating opportunities for learner participation, discussion, collaboration and problem-solving as groups and individuals.
- Creating a safe, whānau-like learning environment for learner-centred activity.

- Designing and applying authentic learning tasks and experiences.
- Designing and creating opportunities for embedded LN practice in a vocational context
- Designing and applying *Ako Teaching and Learning Concepts*.

Category 2: Accomplishing lessons as interactive events

This category refers to the act of implementing a lesson plan and then accomplishing its objectives as an interactive event with learners. The majority of labels associated with this category refer to the interactive skills and strategic discourse moves made by teachers to ensure flow in the learning. Often when barriers in the learning occur, tutors embark on a range of strategic moves to circumvent or overcome these (Bax, 2011; Sinclair and Coulthard, 1975, 1992; White and Lightbown, 1984). A strong focus in the observations was on how tutors enacted key concepts from *Ako: Teaching and Learning* and a range of Māori concepts. This category refers to deliberate observed actions that derive from a pre-planned lesson.

- Initiating exchanges, managing interactions, demonstrating actions, explaining concepts and questioning learners to check on their understanding or to overcome barriers in their learning.
- Using classroom talk to create a favourable learning environment and to specify the roles of learners and how they should engage.
- Initiating and maintaining individual and group interactions to promote learning.
- Developing learners' ways of saying and doing in a specific vocational field, including critical reflection.
- Using classroom talk to enact Māori and Pasifika concepts.

Category 3: Initiating exchanges as key to creating optimal spaces for learning

Category 3 refers to the ways in which tutors structure spaces, often through their discourse, so that they may mobilise the objects, spaces and social resources available in these spaces³ in pursuing specific objectives. The category is related to both the proactive planning (category 1) and the interactive accomplishment of lessons as learning conversations (category 2) (Sankey, Birch and Gardiner, 2010). Planning and interactive implementation are needed to structure spaces and define the roles learners will enact in them.

- Designing and implementing learner-centred learning activities and learner roles that redefine how they use objects, social resources and learning tasks and materials in a vocation-specific setting.
- Designing and implementing a safe environment for students.
- Designing and implementing a range of interactive spaces such as class, tutor-learner, tutor-small group and tutor-group interactions.
- Designing and implementing learning spaces that are consistent with a range of *AKO Teaching and Learning* strategies and Māori concepts.
- Designing and implementing critical reflection as a deliberate and visible learning activity.

Category 4: Embedding literacy and numeracy strategies as deliberate and conscious choices

The main focus of this category is the process tutors followed to plan and embed literacy practices in their lessons. Here we found frequent references to the three dimensions of LN-embedded practice, and how they were aligned in lesson plans (TEC, 2009):

- Identifying the literacy and numeracy demands associated with a programme and describing the LN needs of learners before selecting teaching strategies.
- Incorporating Māori and Pasifika lenses into one's approach to vocational teaching.
- Using question-answer-evaluation sequences to mediate barriers in the learning.
- Explaining LN strengths and LN demands in supporting learners during a session.
- Supporting an action plan devised by Student Learning Services.

³ . The field of geo-semiotics focuses on how these elements in learning environments are mobilised to achieve the best possible outcomes for their learners (Whittingham, 2019).

Category 5: Prompting learners to overcome barriers in learning and/or engaging in learning experiences

Category 5 refers to the tutor's talk encouraging learners to participate, and moment-by-moment teaching strategies used to overcome barriers in the learning. The purpose is to encourage learners to engage and ensure flow in the learning process (Bax, 2011; Sinclair and Coulthard, 1975, 1992; White and Lightbown, 1984). These include the following:

- Creating and activating opportunities for talking and doing with and among learners, including hands-on learning and reflection tasks.
- Asking open or closed questions to maintain the flow of learner participation in a task, providing feedback to steer learning conversations.
- Using extended statement-question-answer-evaluation sequences to overcome barriers in the learning or to explore a task or topic.
- Creating a safe learning environment where positive relationships and a whānau-like experience are pursued.
- Designing classroom exchange systems for individuals, pairs and groups to communicate and collaborate to complete learning tasks.

Category 6: Explaining specific concepts, processes and projects as inputs to gain flow

The emphasis in this category is to ensure that an adequate knowledge base is available, with the tutor mediating key concepts, when needed, as part of tutor-learner, tutor-group, tutor-pair exchanges. Often the explanations are embedded in demonstrate-explain-imitate sequences in which the tutor aligns physical actions and verbal explanations before supervising learner attempts at imitating the targeted actions.

- Demonstrating and explaining a concept, action or process before creating opportunities for supervised imitation in a vocation-specific learning activity.
- Explaining what has to be accomplished (a cluster of related concepts, tasks and project activities), how this is to be accomplished and why the what is important in a vocation-specific context.
- Explaining concepts by activating statement-question-answer-evaluation sequences systematically to unpack the step-by-step reasoning to gain insight into effective and efficient vocation-specific decision-making.
- Explaining lesson objectives, the materials needed, the social resources to be activated and the outputs to be harnessed in a vocation-specific context.
- Managing the flow from one phase of a lesson to the next.

Category 7: Promoting awareness-raising reflective activity

One of the focal points in the classroom observations was tutor and learner reflection as a collaborative learning conversation. Consistently, tutors directed their attention at learners' ability to think, reason and make optimal decisions in vocation-specific tasks and activities (Bax, 2011; Sinclair and Coulthard, 1975, 1992; White and Lightbown, 1984).

- Using statement-question-answer-evaluation sequences to mediate vocation-specific modes of reasoning that promote optimal decision-making in a vocation-specific context.
- Implementing reflection cycles that align with the three stages of a lesson: pre-lesson teacher reflection and activity design, while-lesson collaborative reflection about an activity or phase, and post-lesson reflections.
- Engaging in meta-talk about preferred vocation-specific decisions and actions (i.e. talking about options and identifying optimal choices).
- Activating prior knowledge, specifically, vocation-specific narratives inserted into the classroom talk as memorable accounts of vocation-specific experiences, often as cautionary or exemplary actions.
- Stating specifically why learning experiences have to replicate vocation-specific realities as closely as possible to build learners' self-confidence and competence.

Category 8: Enacting values and cultural frames

The NZCALNE(Voc) training is aimed at developing candidates' insights into cultural frames that have bearing on their learners' ways of being and doing in their socio-cultural contexts (Wintec, 2013; Macfarlane, Glynn, Grace, Penetito and Bateman, 2008). These concepts are stated explicitly in the unit standards of the programme and the AKO document. The following specific lenses were activated by the two academic staff members who analysed their observations (the second and third authors of the report):

- Creating safe learning environments as expressions of *mana atua* (spaces as safe and sacred spaces for engaging in mutually respectful and empowering learning exchanges)
- Creating a whānau-orientated environment that values every participant as a member of the family of learners on the programme and at the institute.
- Activating Māori concepts such as *whakapapa* (identity and origins) as a step into relationship-building, and hands-on learning (*kaikiakitanga*).
- Creating a learning environment where relationships are built (*whanaungatanga*).
- Creating a learning environment where relationships of care can develop (*manaakitanga*).

Category 9: Activating LN demands analysis and LN needs analysis for vocational learners

Two of the key moments in embedding literacy and numeracy occur when tutors map the literacy and numeracy demands of a programme and the specific materials used in teaching; and tutors assess the literacy and numeracy skills of learners to establish the distance between their skill levels and the LN demands of the programme. These can be summarised as follows:

- Enacting a lesson based on the mapped literacy and numeracy demands of the materials and activities selected for learning.
- Showing how the lesson takes into account the learners' literacy and numeracy assessment results.
- Using interactional strategies to respond to barriers in the learning (especially statement-question-answer-evaluation sequences).
- Building in literacy and numeracy activities to promote the flow of the learning conversations.
- Tracking mastery of outcomes to ensure learners gain the skills and knowledge specified in learning outcomes.

Category 10: Pursuing learner autonomy

One of the focal points of programmes at the institute is to develop learner autonomy. We define autonomy as dependent on the level indicators associated with a specific qualification. We raise candidates' (tutors') awareness of the curriculum documents of the programmes on which they teach and the level indicators for the qualification in the New Zealand Qualifications Framework. The purpose of LN-embedding practices is to ensure that adequate scaffolded learning is available so that learners will gain in skill and knowledge so that they meet these indicators (Kinsella, 2007).

- Replicating vocation-specific learning and mastery of skills and knowledge that apply to a specific vocation-specific qualification
- Progressing from scaffolded and supported learning at the start to independent activity at the end of a programme.
- Enacting feedback cycles to learning, including group activities, individual work and project-based activity.
- Developing cycles of reflection to explore processes and outcomes in learning activities.
- Modelling appropriate actions including demonstrate-explain-imitate sequences.

Category 11: Promoting authenticity in vocational tasks and experiences

Another focal point of instruction at the institute is its focus on vocational training. For this reason, authenticity is a key construct pursued by all tutors in their teaching. We distinguish between authentic tasks and authentic vocation-specific learning experiences, acknowledging that the former should not be seen as a guarantee of successfully creating an authentic learning experience. The following categories relate to this construct:

- Stating specifically why learning experiences have to replicate vocation-specific realities as closely as possible to build learners' self-confidence and competence

- Activating prior knowledge, specifically, vocation-specific narratives inserted into classroom talk as memorable accounts of vocation-specific experiences, often with either a cautionary or exemplary function.
- Replicating vocation-specific learning and mastery of skills and knowledge that apply to a specific vocation-specific qualification
- Demonstrating and explaining a concept, action or process before creating opportunities for supervised imitation in a vocation-specific learning activity.
- Explaining what has to be accomplished (a cluster of related concepts, tasks and project activities), how this is to be accomplished and why the what is meaningful in pursuing in a vocation-specific context.

Correlations among categories

Replicating the 2018 analysis, we include the correlations among categories (generated as part of the principal components analysis. Some moderate to high correlations are found in the matrix. These range from 0.475 to 0.936.

Table 1: Correlations among 11 categories (N=11)

		Interact	Initiate	Embed	Encourage	Explain	Aware	Values & Culture	Mapping & Needs	Autonomy	Authentic
Cor-relation	Proactive	-0.039	0.012	0.245	0.138	-0.098	-0.055	0.152	0.209	0.031	0.049
	Interact		0.641	0.183	0.312	0.213	0.058	0.088	-0.042	0.107	0.098
	Initiate			0.408	0.348	0.304	0.305	0.033	0.024	0.367	0.362
	Embed				0.505	0.079	0.138	0.243	0.180	0.241	0.234
	Encourage					0.177	0.080	0.333	0.229	0.158	0.155
	Explain						0.274	0.100	-0.006	0.111	0.128
	Aware							0.196	0.108	0.475	0.496
	Values & Culture								0.392	0.132	0.132
	Mapping & Needs									0.223	0.209
	Autonomy										0.936
	Sig. (1-tailed)	Proactive	0.077	0.336	0.000	0.000	0.000	0.023	0.000	0.000	0.134
	Interact		0.000	0.000	0.000	0.000	0.018	0.001	0.067	0.000	0.000
	Initiate			0.000	0.000	0.000	0.000	0.115	0.189	0.000	0.000
	Embed				0.000	0.002	0.000	0.000	0.000	0.000	0.000
	Encourage					0.000	0.002	0.000	0.000	0.000	0.000
	Explain						0.000	0.000	0.421	0.000	0.000
	Aware							0.000	0.000	0.000	0.000
	Values & Culture								0.000	0.000	0.000
	Mapping & Needs									0.000	0.000
	Autonomy										0.000

C1: Proactive planning; c2: Interactive lesson; C3: Tutor initiations; C4: Embedding practices; C5: Encouraging and prompting; C6: Tutor explanations; C7: Awareness-raising; C8: Values and Culture; C9: Mapping demands and learner needs; C10: Learner Autonomy; and C11: Authenticity in learning

The tutor as a designer of interactions: The moderate to high correlation between the *interactive accomplishment of a lesson (C2)* and *tutor initiation moves (C3)* (0.641, $p < 0.0$) is expected: teacher initiations are significant moments in learning interactions. In these moments the teacher may engage in talk about the lesson, where it is headed (meta-talk), what a project entails (instructions and project outlines), and how learners are to complete learning tasks or engage in learning conversations (teacher and learner roles and responsibilities).

Strategic interactive skills: The moderate level of association between *embedding practices (C4)* and *encouraging and prompting (C5)* ($r=0.505$, $p<0.00$) highlights that embedding practices have a strategic dimension: tutors have to be able to deploy interactional styles and patterns of interaction to ensure the flow of learning conversations and tasks, as well as mediate barriers in the learning.

Replicating real-life in learning: Similarly, the moderate correlation between *Awareness-raising (C7)* and *Learner autonomy (C10)* ($r=0.475$, $p<0.00$) and *C7* and *Authenticity in learning (C11)* ($r=0.496$, $p<0.00$) seem to offer validation for Van Lier's (1995) triad of Awareness, Autonomy and Authenticity. We could reason that raising awareness (C7) of authentic learning that replicates vocational contexts (C11) is associated with equipping learners with competencies that enhance their autonomy as learners (C10).

Building learner confidence through exposure to real-life vocational activity: *Learner autonomy (C10)* shows a high level of association with *authentic learning (C11)* ($r=0.936$, $p<0.00$). This suggests that one of the prominent factors in vocational training is how authentic learning is promoted and achieved. Authentic tasks, as we stated earlier, are not a guarantee that learners will experience learning as authentic.

These interpretations are intended to show that we should be aware of the fragmenting effect of reporting discrete findings. Correlations can be used to explore how discrete categories are interwoven into a network of pedagogical meanings. The PCA and CA results below are interpreted from the same perspective.

Principal components analysis

In this section we report and explain briefly the principal components identified in the Principal Components Analysis (PCA) (Field, 2014). These findings are reported in Table 2 and Table 3 below.

Table 2: Principal Components Analysis (PCA) - Total variance for codings explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.251	29.556	29.556	3.251	29.556	29.556	2.388	21.708	21.708
2	1.656	15.057	44.613	1.656	15.057	44.613	2.206	20.057	41.765
3	1.606	14.597	59.209	1.606	14.597	59.209	1.707	15.516	57.281
4	1.055	9.593	68.802	1.055	9.593	68.802	1.267	11.521	68.802
5	0.797	7.242	76.045						
6	0.734	6.674	82.719						
7	0.622	5.656	88.376						
8	0.531	4.832	93.207						
9	0.439	3.993	97.200						
10	0.245	2.225	99.424						
11	0.063	0.576	100.000						

Extraction Method: Principal Component Analysis.

The analysis identified four components which explain 68.8% of the variance in the binary codes in the data set. Table 2 shows that component 1 explains 21.71% of this variability. In Table 3 below, the cells show the level of association between the 11 categories and the five components. The shaded cells in each column indicate the cluster of items that constitute the component.

For example, the high loadings on component 1 reinforce the interpretation of the moderate correlations between three categories (see **Replicating real-life learning**), while the four high loadings on C2 to C5 emphasise the interactional accomplishment of lessons as strategic learning conversations: C2 refers to the interactive process, C3 to the authority of the tutor to design speech exchange systems for learning purposes, C4 to seamlessly integrated

strategies to promote LN, and C5 to teacher encouragement and prompts to promote the flow of learning conversations. Component 3 relates to LN pre-teaching planning and design: the proactive phase of lesson planning (C1) involves the intentional design of learning activities that enhance values and culture (C8), as well as mapping the demands of a course and identifying the LN needs of individual learners (C9).

Table 3: Rotated Component Matrix^a

	Component			
	1	2	3	4
C1: Proactive	0.004	0.127	0.284	-0.654
C2: Interact	-0.009	0.795	-0.116	0.193
C3: Initiate	0.336	0.814	-0.098	0.131
C4: Embed	0.166	0.599	0.319	-0.340
C5: Encourage	-0.003	0.631	0.470	-0.088
C6: Explain	0.089	0.303	0.194	0.691
C7: Awareness	0.655	0.049	0.197	0.375
C8: Values & Culture	0.041	0.082	0.826	0.098
C9: Mapping & Needs	0.191	-0.061	0.716	-0.166
C10: Autonomy	0.939	0.135	0.067	-0.063
C11: Authenticity	0.944	0.128	0.069	-0.054

Extraction Method: Principal Component Analysis.

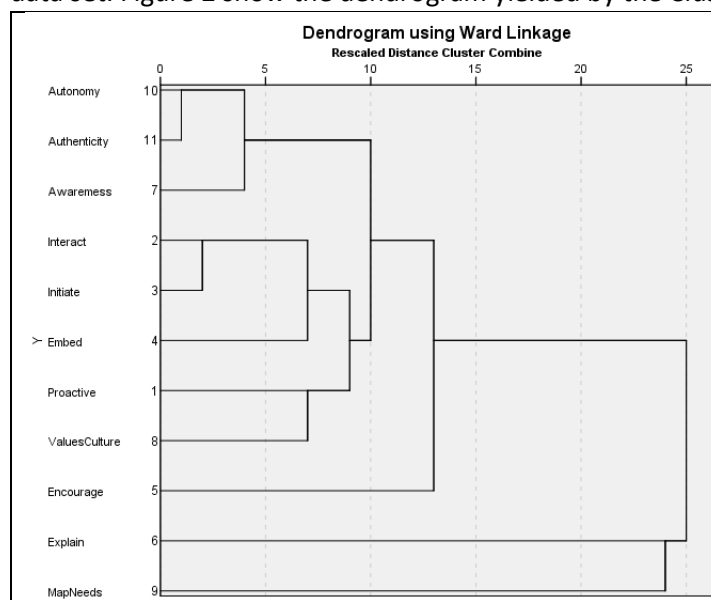
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

- C1: Deliberate proactive lesson planning and pre-teaching choices of teaching strategies, methods and techniques.
- C2: The interactive accomplishment of lesson plans as intentional learning conversations.
- C3: Deliberate teacher initiations to enact a lesson plan or initiation-response-evaluation sequences aimed at circumventing barriers in the interaction.
- C4: Deliberate and explicit references to literacy and numeracy embedding.
- C5: Prompting and encouraging teacher acts aimed at facilitating learner participation.
- C6: Strategically embedded teacher explanations to ensure learners develop appropriate modes of informed vocational reasoning.
- C7: Teacher prompts to raise learner awareness of vocational constructs and actions in relation to training tasks and experiences.
- C8: Teacher acts deriving from or promoting workplace and/or cultural values.
- C9: Matching LN demands of a programme and the LN needs of learners.
- C10: Designing learning experiences to promote learner autonomy.
- C11: Designing authentic tasks.

A dendrogram from a Cluster Analysis

A cluster analysis yielded a dendrogram which provided a visual account of how the ratings were configured in the data set. Figure 2 show the dendrogram yielded by the Cluster Analysis.



- C1: Deliberate proactive lesson planning and pre-teaching choices of teaching strategies, methods and techniques.
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- C10: Designing learning experiences to promote learner autonomy.
- C11: Designing authentic tasks.

Figure 2: Dendrogram of clusters for the 11 categories of labels

In brief, these results confirmed that

- component 1 in Table 3 aligns with the correlations among C7, C10 and C11 (Table 1) and the cluster of C10, C11 and C7 at the top of the dendrogram in Figure 2.
- component 2 in Table 3 is roughly associated with the cluster of C2, C3 and C4, but includes other categories. The cut-off point of 5 on the top horizontal bar narrows the association down to C2 and C3 which focuses on the **teacher as a designer of learning spaces** (See the correlations above).
- component 3 in Table 3 shows high loadings on C8 (Values and Culture) (0.826) and C9 (Mapping and Needs) (0.716). Interestingly, this component is not cross-validated by the structure of the dendrogram in Figure 2. Using three statistical procedures we can fall back on correlations and the PCA, we may still argue that Matching LN demands of a programme and the LN needs of learners should incorporate workplace culture and cultural values. These demands and needs should be viewed against the broader canvas of socio-cultural and employability in a New Zealand context.

Discussion

As pointed out in the footnotes, the second and third authors performed a comprehensive analysis of 19 classroom observations. The so-generated labels were then sorted and 11 high-level categories were defined. An axial analysis was performed to gain an idea of connectedness of labels to the high-level categories. The brief to the two analysts was to analyse the classroom in an Excel sheet, creating as many rows as needed to label front-of-mind aspects of LN-embedding activity and its pedagogical context in their classroom observation texts. This process yielded 1302 labels and 14322 (1302 x11) ratings. The advantages of the procedure were the following:

- The labels represented a composite set of lenses activated by the two analysts, potentially contributing to a more diverse set of labels than for the 2017-2018 report (Greyling, 2019).
- The axial analysis prompted us to consider how the labels were related to each other – labels refer to concepts and processes that should be viewed as seamlessly integrated learning events and experiences.
- If viewed from a holistic perspective, the high-level categories offer an evaluative framework for planning and assessing lessons.
- The two analysts offer an insider's perspective, putting on display the lenses they used in the analysis.
- The three analysts brought insider views to the analysis and the strategy could be seen as an emerging form of investigator triangulation (Stake, 2008) in our team practice.

The main disadvantages of our approach are that:

- the act of labelling fragments the classroom observation text so that findings have to be reinterpreted to establish a holistic and integrated account of the learning events.
- the report remains exploratory, capturing the multiple lenses that team members brought to bear on classroom observations they had produced.

Thus, we argue that our approach was exploratory, generating a team-specific account of the potential pedagogical meanings associated with the observed classroom events. Given that the LN-team is newly constituted, we view this report and its data as a baseline for developing our analyses of classroom observations as a source of evidence of compliance. It also has a social-constructivist purpose to develop a socially-distributed account of teaching practices observed at the institute. We assume that the three analysts activated diverse lenses to make sense of the complexities that occurred in instructional settings in which LN-embedding practices were required.

The 11 categories we identified represent key elements in teaching and learning in any context. The following specific observations can be made:

- **Seamless integration of LN strategies:** LN-embedding practice is associated with good pedagogy, and seamlessly integrated into lessons and how the latter are accomplished as interactive learning conversations.
- **Deliberate action:** Deliberate and intentional practices are constants – tutors design spaces, tasks and role definitions they deem to be needed to achieve learner success, including how LN skills will be promoted and developed.
- **Tutor initiations as implementation of deliberate designs:** Tutor initiations are key moments: at the start of a sequence of lessons, they create the appropriate learning environment, define the parameters of the task, and inform everyone as to how the social resources (i.e. defining tutor and learner roles), objects and materials will be used to achieve pedagogical ends (Whittingham, 2019).
- **Tutor mediation:** Tutors are mediators of learning which means that they not only plan strategies to enhance the flow of learning activity, but also deploy strategies to overcome barriers in the learning.
- **Knowledge management and hands-on skills development:** Tutors manage learner mastery of relevant knowledge, skills, attitudes and values to develop a professional role. Their efforts are aimed at developing learners' ability to find information so that they may think, reason and act appropriately in vocation-specific contexts.
- **Reflection, autonomy and authenticity:** Critical reflective activity, learner autonomy and authenticity are key principles that inform their delivery (Kinsella, 2007).
- **Cultural values and frames:** Tutors are very much aware of cultural frames that impact on learner success and they are therefore mindful of accommodating the ways of being and doing of Māori, Pasifika and other cultures. This aspect is firmly integrated into the New Zealand Certificate in Adult Literacy and Numeracy Education (Vocational) (Chauvel and Rean, 2012).

The Principal Components Analysis (PCA) and the Cluster Analyses (CA) cross-validated the conclusion that authenticity, awareness and autonomy were closely related (C7, C10, C11). This validates a triadic relationship proposed by Van Lier (1996). Teacher and learner awareness is associated with explicit knowledge and conscious choices in vocational contexts. The latter, if replicated in vocational education, promotes authenticity. If teachers and learners master the modes of being, doing and decision-making in simulated work contexts, they develop their autonomy in their professional educator roles. This dynamic was prominent in the classroom observations.

The PCA and the CA also cross-validated the notion that lessons are interactively accomplished learning conversations (C2) which require strategic teacher initiations to maintain the flow in the exchanges of ideas among classroom participants (i.e. tutor-class, teacher-group, within-group and between-group exchanges). Tutors' competence in teaching and expert knowledge form the basis of their authority to design, implement and direct learning conversations (C3).

Conclusions and recommendations

We concluded that the cohort of candidates mastered and displayed LN-embedding practices, in both planning and the interactive accomplishment of their lessons, which are typically associated with learner-centred LN-embedding approaches, and these were consistent with the guidelines and requirements in TEC and Ako Aotearoa documentation (TEC, 2009; Whitten, 2018), the Wintec LN Policy (2018, Revised), and the organisation's *Ako: Teaching and Learning* document (Wintec, 2018). These findings also replicate the findings reported in Greyling (2019) for the 2018 sample of classroom observations.

We also concluded that a team-based approach to analysis promoted the validity of our analysis, with multiple perspectives being activated in exploring the key themes and dynamics evident from the classroom observations.

Our recommendations include the following: that

- the LN team continue to collaborate on the analysis and interpretation of classroom observations as sources of text-based evidence of tutor practices to promote the reliability and validity of these analyses.
- the 11 categories serve as potential prompts for exploratory reflective conversations with targeted tutors.
- classroom observations (which form part of case studies for candidates) be placed within an integrated framework that includes LN assessment data and LN mapping outcomes for programmes as these sources of evidence provide an account of the knowledge, skills, attitudes and values developed in candidates.
- the LN team continue to seek opportunities to develop a whole-of-organisation approach (Coolbear, et al., 2012), te Ōritetanga Project support, and value-chain analysis.

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