**Introduction**

This article draws on data from a larger study of how a student led CoP facilitates undergraduates’ professional development. Findings from the previous study have been published elsewhere, and explored the experiences of the student coordinators of the CoP (Bates and O’Brien 2013). The present study seeks to understand if the experiences of the broader student cohort were similar to those of the coordinators. Both studies aimed to explore the processes and social practices through which undergraduate aviation students developed professional competencies and identity. In the first study, the research discussed how the CoP was an effective tool for fostering a sense of professional identity. This was facilitated through engaging in meaningful practice, providing the students with a platform from which to begin developing confidence with their novice professional identity and connecting with the broader aviation community. The CoP was also significant as it allowed the students to develop a range of skills that have been identified as contributing to their success as an aviator. These skills include; an ability to work in a team environment (important for non-technical skills/human factors) (Australian and International Pilots Association 2010), self-confidence, situational awareness (Koonce 2002), the ability to lead or follow, communicate well with associates and apply critical thinking (Senate Standing Committee on Rural Affairs and Transport 2011). Many of these skills are also included in generic graduate outcomes that are integral to quality assurance in Australian universities (Barrie 2006). The present study therefore investigates the sociocultural practices that assist students to begin to develop a sense of professional identity.

**Communities of practice**

Lave and Wenger’s (1991) work describes the relational and social process through which those involved with a CoP actively engage in the construction of knowledge and practice. Communities of practice can therefore be defined as ‘groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in the area by interacting on an ongoing basis’ (Wenger, McDermott and Snyder 2002). CoP have been extensively examined in
organisational, as well as post-graduate higher educational settings. The framework has also been used to examine the development of professional identity for lecturers in higher education (Bathmaker and Avis 2005; Blanton and Stylianou 2009; Jawitz 2009) and graduate programmes in higher education (Monaghan 2011; Monaghan and Columbaro 2009). However, little attention has focused on how CoP assists undergraduates to develop their professional identity and knowledge that are central to successful professional practice. The relevance of CoP for the development of professional identity rests on the interrelatedness of four main indicators: community; practice; meaning and identity; and brokering connections (Wenger 1998, 2000). We shall now explore these indicators in more detail.

Lave and Wenger (1991, 98) argue that a community is ‘an intrinsic condition for the existence of knowledge’ and creates the social milieu for learning. Through mutual engagement newcomers work together with both experienced members and peers to achieve the goals of the community. Initially newcomers are peripheral members and as they engage in the sociocultural practices of the community they move towards fuller participation (Lave and Wenger 1991). Learning occurs within the social relationships of the CoP and through experiencing, belonging and participating, the self and identity is developed (Barab and Duffy 2000).

Learning and knowledge generation also occurs through doing and situating practice within authentic contexts. Often the knowledge generated from the informal context of the CoP is tacit rather than necessarily explicit (Wenger 1998). Through a sense of joint enterprise or passion about a topic, members of the community negotiate a way of working together to achieve the goals of the community (Wenger, 1998). The interpretive support provided by the CoP progresses practice through interactions on an ongoing basis (Wenger et al 2002, 4). The community therefore offers the opportunity for members to ‘negotiate competence through the experience of direct participation’ (Wenger 2000, 229). In this way through learning, practice and knowledge production identities are formed and re-formed (Wenger 2000).
Wenger (2000, 241) argues that identity needs a ‘home base’ from which members can develop competence that both signifies their belonging and gives meaning to practice. Through mutual engagement, working with and observing experienced members, the identity of both is expanded (Wenger 2000). In demonstrating competence in accessing the shared repertoire of the community, the artefacts, language and routines members develop a sense of who they are as they learn through social interactions. Identity is therefore a process of becoming through accessing competence and experience (Wenger 1998).

Continuing to push the competence through experience dynamic are interactions with other CoP that provide new opportunities for new knowledge and practice. Pivotal to these interactions are brokers who facilitate the introduction of one practice into another. Through these exchanges and exploring new territories, a bridge is created between one community and another. Direct exposure to another practice enables the creation and maintenance of social relationships across the boundaries of different CoP (Wenger 1998).

CoP and their collaborative, problem-centred discussions, are particularly suited to aviation student’s learning styles (Karp 2004). Karp also (2004, 45) argues that aviation students are ‘dominantly, visual, auditory, or hands-on, tactile or kinesthetic learners’, and require an educational setting that will accommodate these learning styles. CoP are therefore an invaluable medium through which students can engage in practice to develop skills that are pivotal to success in the aviation industry. Without such a facility, students may find it difficult to develop both the skills and sense of identity that accompanies the development of competence and experience.

The MATES CoP

Students enrolled in the Bachelor of Aviation at Griffith University are required to attend the MATES CoP for the duration of their degree. To maintain the aviation connection each CoP is called a ‘Flight Group’. Each of the five ‘flights’ have approximately 80 members of both first and second year students. At this stage of their degree, most students have not commenced their flight training, this occurs in the third year through an external airline academy. The ‘flights’ are led by a small
leadership team, comprising a flight leader and deputy flight leader drawn from the third year student cohort. The leaders, who are at the airline academy, are the ‘community coordinators’ (Wenger 2000) who organise activities and functioning of the CoP. The leaders are provided with a guide for material to be covered in the two hour weekly meetings, although the emphasis is on providing an informal platform of participation. A typical meeting would involve students providing industry updates, engaging in public speaking, developing leadership skills and preparing for interviews. Overseeing the flight groups are a senior leadership team of a chief student pilot and deputy chief student pilot, also drawn from the third year cohort, who ensure uniformity of content in the CoP.

MATES CoP has four central aims. The first was to provide the students with a medium through which to engage with their peers in a community to identify gaps in their knowledge and discuss and share information. Through joint enterprise and social engagement with other students, relationships are built through which students learn from each other. Fostering these relationships is facilitated by the regularity of the meetings throughout the two academic semesters. Initially new students are peripheral members and are mentored by existing members into the CoP during orientation week. As the peripheral members progress in their involvement throughout the duration of their degree they eventually become core members, although not all follow this trajectory.

The second aim of MATES CoP was to provide students with an avenue in which to develop meaningful practice. Through the sharing of a repertoire of resources, concepts, language and tools the community works together to address problems and issues. At the beginning of each semester the leadership team works in conjunction with the second author (who operates at the periphery of all flight groups to ensure content quality) to plan and organise the content material for the flight
group. The programme is directed at developing the competence through experience dynamic through engaging in authentic practice, such as applying navigation skills.

The third aim was to provide students with a ‘home base’ in which a sense of identity can be developed through the cultivation of competencies and participating in the community’s practices (Wenger 2000, 241). MATES CoP therefore give students the opportunity to create meaning making moments that move beyond just the acquisition of skills and information, to facilitate a sense of identity transformation. An integral aspect of identity transformation is the requirement that all students wear a pilot’s uniform complete with the school’s aviation epaulets to the weekly meetings. The uniform signifies a sense of belonging to MATES CoP, as well as belonging to the broader aviation community as they come to see themselves as novice professionals. Through their sense of belonging and contribution to the community, a student’s identity evolves as they move from periphery to core members (Jawitz 2009).

The final aim was to provide a bridge between students and professionals from the broader aviation community. The second author acts as a broker between the aviation community and MATES CoP through weekly visits by industry professionals. These visits comprise an additional hour session when all flight groups come together for the presentations. During these sessions students are also given the opportunity to question and discuss areas of interest with the visitors. The flight leaders also take on the role of brokers in their final year as they begin their flight training and engage with the broader aviation community.

The study

Participants

Participants were recruited through a request for volunteers at lectures and a follow-up general email to the third year cohort. Information on the project was also provided at this time. The sample was largely purposive (Miles, Huberman and Saldana 2014), as the students were those who had
two years of experience with MATES, and had, at the time of interview, commenced their flight training. The sample consisted of five males and two females. Four were aged 20, two were 22, and the remaining student was 28. Ethical approval was granted by Griffith University.

**Data collection and analysis**

The interviews were conducted during the course of the students’ third year, when they had commenced their flight training. The interviews were not designed to elicit an evaluation, but rather to understand the socially situated processes that contributed to the development of the students’ professional identity. Gilardi and Lozza (2009) argue that understandings of professional identity arise from socially situated experiences. With this aim in mind data were collected via single semi-structured face-to-face interview using a set of open-ended interview questions. The semi-structured interview provides the interviewer with a clear guide, whilst countenancing flexibility in exploring ideas and understandings of the participants, allowing their voices to emerge. The semi-structured format provides structure in ensuring all interviews cover the same topic and therefore delivers reliable and comparable qualitative data (McCracken 1988). The interviews were also in-depth, focusing on the experiences of people and the meaning they attach to that experience (Seidman, 2006). The interviews ranged between thirty and forty minutes in duration and were conducted in one sitting on an individual basis. Interviews were digitally recorded and then transcribed. Transcriptions were analysed using a deductive thematic approach that utilised the CoP indicators outlined above as analytic categories (Braun and Clarke 2006). Through this theoretically informed mode of analysis the transcriptions were thoroughly read and reread by the first author to code the data following CoP indicators: community; practice; meaning and identity; and brokering connections. Refining the themes involved a process of checking the coded data and the theory to ensure they reflected the ‘keyness’ (Braun and Clarke 2006) of a theme as it related to CoP indicators. The four themes based on the CoP indicators were: Building community: ‘Having the
same dream’; Practice: ‘Talking like a professional’; Meaning and identity: ‘Looking the part’; and Brokering connections: ‘Opening your eyes to the industry’.

**Building Community: ‘Having the Same Dream’**

First year aviation students were mentored into the MATES CoP programme in orientation week and from there they began to develop relationships within their flight group. The developing social relations and opportunities for participation created a sense of belonging. As one student pointed out ‘MATES did facilitate it …, especially in the beginning of uni, you don’t know anyone so you do come in, you belong to a group, so you do start developing bonds’ (Sean, age 20). The sense of belonging underpins learning through social practice, and is a key to learning and becoming (Warhurst 2008). Di’s (age 28) experience was similar. She said that ‘I think because from the very beginning … the first orientation day, you get put with your MATES group and I guess everybody … from that first day, …you don’t know anybody, and you all become sort of friends’. These bonds and the sense of joint enterprise and ‘having the same dream’ (Di) were also pivotal in creating a sense of belonging that in turn fosters learning (Warhurst 2008). Kevin (age 22), felt that working together with peers and the sense of belonging and joint enterprise, ‘we’re all there learning together’, was an important aspect of his participation.

As Kevin’s point makes clear, creating a sense of community, and the interaction between peers as well as those with experienced members were significant relations of learning and knowledge generation. Relationships between peers fostered a sense of mutual engagement as well as providing an avenue for appropriation of knowledge. Peer and near-peer relations effectively facilitate the advancement of knowledge and skills (Lave 1991). Kyle (age 22) said ‘you know all these people, you … know how to talk to them, how to approach them as well, and you know their knowledge base as well so you’re not going to say something stupid to them’. The sense of joint enterprise and developing relationships with others with varying levels of expertise was also central to engagement and co-participation. Nate (age 20), for example explained that MATES CoP gave him the opportunity to talk to others within the aviation degree who had flying experience. He said
‘talking to people like that in the MATES environment … it can kind of give you an insight into what to expect’. Learning from experienced members and peers also developed his sense of competence through experience, as newcomers were motivated to expand their own knowledge and practice through listening to others. Monica (age 20) said that ‘hearing other peers of other levels talk about aviation … you want to be up to that standard so I suppose you’re driven to … work harder at talking and learning more about the aviation industry’. In this way through the processes of legitimate peripheral participation, and engaging in social practices, newcomers become part of the CoP (Lave & Wenger 1991). It is also through active participation in the community that practice develops (Wenger 1998).

**Practice: ‘Talking Like a Professional’**

Lave and Wenger (1991) identify that learning to use the shared repertoire within a particular CoP, is both meaning making and a significant aspect of how the community shares knowledge and learns from its members. Participating in the stories and conversations within the CoP was integral to legitimate peripheral participation. Having access to and absorbing how experienced members talk and engage in the socio-cultural practices of the community affords opportunities for full participation (Lave & Wenger, 1991). Sean (age 20) felt that through listening to experienced members he had learnt ‘a lot of phrases as well … we’re listening to the way they speak … so they influence us almost and then … just the terms they use’. Learning to talk like a professional, is not simply dependent on acquisition of knowledge from formal sources, but also occurs through social interaction with more knowledgeable peers (Swanwick, 2005) Using the shared repertoire of language and stories thus contributed to the accumulated knowledge of individuals and the community. Often the acquisition of aviation language was implicit. Egan and Jaye (2009) assert that forms of practice often assume implicit knowledge and the development of practice styles that are distinctive to the CoP. As Monica (age 20) illustrates learning to ‘talk the talk’ (Swanwick 2005), learning aviation language and practicing it within the context of the CoP had enabled her to talk like a professional. She indicated that it ‘is something I’ve definitely picked up. The more you’re around
it, talking to your peers, using the aviation language ... definitely just learn it like that’. Acquiring the aviation language and ‘talking like a professional’ (Monica) was therefore an important staging post towards a student’s sense of themselves as a novice professional. Importantly as Swanwick (2005) argues, language use is significant in defining a sense of professionalism.

The students were also given the opportunity to put into practice the learning that occurred through the CoP. It was often the ‘little things’ (Kevin age 22) such as aircraft recognition or how to interpret radio calls that students were expected to know. However, they felt they were not afforded the opportunity to acquire this knowledge within normal curricula contexts. This ‘knowledge’ in relation to the norms of a profession is associated with increases in confidence and feeling like a professional (Hunter, Laursen and Seymour 2006). Nate (age 20) discussed how learning to identify aircraft at MATES CoP was now serving him well as he commenced his flight training;

I think that relates back to airmanship, knowing the different sort of aircraft that you’re going to come across in the sky because once, I noticed, you’ve reached this stage of the flight training and you’re up there, air traffic control says something like there’s a Beach Baron in front of you, to be able to know what kind of aircraft that is and kind of relate that back.

Through giving meaning to explicit knowledge, the possibility exists to push capabilities forward (Saint-Ong and Wallace 2003).

Working in a team, and knowing how you perform in a team, is a pivotal component of non-technical skills/human factors (Australian and International Pilots Association 2010). Flight groups therefore engaged in ongoing team-work activities that were designed to push practice forward through taking responsibility for the learning agenda. Sean (age 20) indicated that the team-work activities he was involved with would help him when confronted with having to operate in a team environment; ‘a lot of airlines I guess are looking for someone who can operate in that team or group, where you have to be able to know the topic and then elaborate on it and explain it’. These
experiences were not only valuable for learning about one’s role in a team or crew, students also drew on their experiences in interview situations.

Practicing for interviews was also mentioned by the majority of students as a learning project that they felt was beneficial. Interviews for airlines are quite specific and protracted, and practicing for the process added to a student’s confidence when faced with a real interview. Quentin (age 20) discussed how the practice had assisted him during his interview for an airline cadetship.

So I’ve definitely developed skills with interview practice ... that was always a big thing in both second and now carrying on into the third year. Developing that into your practice which was really beneficial for when I did go for an interview with an airline last year, and I’m still waiting for the private pilot’s licence before you go for the second stage interview. So interview practice was a big one.

Situating the interview in authentic practice pushes the development of the students’ competence through experience and provided a useful resource for both the community and the individual.

The weekly industry update was similarly used as a learning project that contributed to the practices of the community. Each week students volunteer to provide the CoP with current aviation news. Both newcomers and experienced members continue to learn through this practice. Nate (age 20) discussed the importance of the industry updates for both himself and the community, ‘I think it benefited everyone’s knowledge overall as well because the public discussions or presentations were based on news in the industry, so getting an idea of how the industry works as well’. In this way the meaning underpinning the practice is appropriated through sharing of knowledge in the form of stories and conversations. Through contributing to and exchanging ideas, newcomers move towards fuller participation in the CoP as well as extend their experiences of competence.

The students’ recognition of how MATES CoP contributed to their knowledge and practice often occurred when they reflected on their involvement during the interview process. They then identified how MATES had provided a platform to advance their knowledge and practice and gave them a place in which to create meaning about practice. This form of tacit knowledge is gained by
learning through doing, and through social interaction, and the use of CoP specific language and artefacts (Amin and Roberts 2008). A key artefact used in the MATES CoP was the uniform, which was a significant aspect of the creation of an identity as a novice professional.

**Meaning and Identity: ‘Looking the Part’**

For all students the uniform was both a key signifier that they belonged to the CoP, as well as signifying that they were also embarking on their journey towards becoming a member of the broader aviation community. For students entering vocational disciplines, such as aviation, there are limited opportunities to develop their professional identity whilst at university. Wearing the uniform began at the same time students commenced their involvement in MATES CoP. Some students found it difficult at first to feel ‘comfortable’ with both the uniform and their new identity. Kevin (age 22) was initially embarrassed wearing his uniform, but as he progressed towards full participation in the CoP he saw it as a ‘stepping stone’ towards ‘wearing it for the rest of our working lives’. Kyle (age 22) was also hesitant about wearing the uniform as he felt that he didn’t have the ‘knowledge behind it’. Wenger (2000, 239) points out that identity ‘combines competence and experience into ways of knowing’. The acquisition of knowledge was therefore an important aspect of identity formation. Wearing the uniform enabled students to actively engage in ‘building meaning’ through the ongoing interactions with others (Gilardi and Lozza, 2009, 247). As Wenger (2000, 239) argues, ‘identity is a lived experience of belonging’. Di (age 28) illustrated how this sense of belonging contributed to her overall professional identity;

> I always enjoyed wearing the uniform, I felt ... it was good to sort of belong to something, and especially when ... that’s what you want to do, you just sort of felt like you were becoming a professional.

While the students only wore the uniform on Wednesday night, once they had accommodated the uniform into their identity they were able to participate more readily in the social world of the CoP. The uniform also allowed students to move from periphery to full participation as well as cementing the sense of joint enterprise. Quentin (age 20), for example said; ‘just when you’re wearing the
uniform everyone’s of an equal, sort of an equal level’. Sean (age 20) expressed similar sentiments that also reinforced joint enterprise and mutuality ‘you do feel ... as an individual, you belong to this group, you are working towards a goal’. In this way identity is formed through participation and meaning making interactions (Wenger 2000). A strong identity involves shared experiences and histories of learning through which the identity of the newcomer evolves (Wenger 2000).

Wearing the uniform also enabled students to transition more readily to flight training school. Students indicated that the uniform gave them more confidence to be around other aviators such as those at the flying school. Increases in confidence are an important factor in the students’ professional development (Gilardi and Lozza 2009). Monica (age 20) said that wearing the uniform and ‘looking the part makes you feel like a professional. So it is very important ... and it makes you feel like part of that aviation community.’ Through strong social relationships and deep connections with others, who reinforce the students’ sense of identity, the students’ past and future identity merge into the ‘experience of the present’ (Wenger 2000, 241). In this way the students’ identity continued to transform as they moved into the flying school with others from their CoP. Di (age 28) discussed how her sense of identity had expanded as she crossed the boundary from the MATES CoP to flying school, ‘You just sort of felt like you were becoming a professional. I guess it’s taken on more meaning now when we have to wear it every day and we’ve got more attachments and things like that.’ The movement across boundaries was also facilitated by the second author who operates on the periphery of the MATES CoP and the broader aviation community.

**Brokering Connections: ‘Opening Your Eyes to the Industry’**

Through the weekly visits by industry professionals students were afforded the opportunity of direct exposure to their potential future practice. To facilitate these connections, the second author brokers the attendance of industry professionals at MATES CoP on a weekly basis and oversees their presentation. Kenny, Mann and MacLeod (2003) highlight the importance of role models both in learning and identity formation. The professionals discuss working within their area of expertise and their own flying experiences. Students are also given the opportunity to ask questions about the
visitor’s experiences throughout their career. All of the students indicated that the visits by industry professionals created a ‘bridge’ (Wenger 2000, 234) between MATES CoP and the broader aviation community. Kyle (age 22) discussed how the visiting professionals gave him a picture of what life is like as a professional aviator.

It sort of opens your eyes to what’s happening in the industry. They say this is what you’ve got to do… you get checked every three months so it’s a pretty heavy industry and all this. So it doesn’t get easier, it just – you keep learning things. If you hear that and you still keep going, it’s a good motivation, to say, okay, I can do that. If you know what you’re in for it sort of prepares you.

Wenger (2000, 235) contends that stories and experiences ‘allow people to walk in others shoes’ and open new possibilities for learning and identity development. The students found these stories and experience both inspirational and a source of valuable knowledge that they indicated they would use in their own practice. Quentin (age 20), for example thought he might draw on the experiences of a visiting commercial airline captain who had described how he dealt with an emergency situation.

I guess that would help me professionally if there was ever an incident … The skills I learned from him were remaining calm under the intense pressure and, of course, delegating tasks to reduce the work load or spread the work a bit more evenly. So it’s getting someone like that … to talk really helped me develop as a professional by seeing what he did, what the professional actually did, and I can use that in my own experiences now.

In this way, through absorbing how experienced aviators conduct themselves in their professional practice, students are given the opportunity to begin their apprenticeship in the broader aviation community.

Students were also afforded the opportunity to interact with the visiting professionals and ask questions. Kalet, Krackov and Rey (2002) contend that interactions such as these provide the opportunity to deepen understanding of professional principles and skills. Conversing in a shared language of practice also opened up opportunities for shifts in identity. Students drew on the language that they had acquired in the CoP in their discussions with the industry professionals. Learning from others’ talk familiarises students with the attitudes and values of the industry, but
also develops the students’ identity. As newcomers or novices in the broader aviation community, these interactions provided further opportunities for students to ‘get a foot in the door’ (Kevin, age 22) and begin to see themselves as potentially belonging to that community.

Through sharing stories and observing how experienced professionals conducted themselves, students were given an insight into what being part of the aviation community involved. Kevin (age 22) discussed the value of his interactions with the industry professionals.

They’ve always got some little piece of information that we don’t know. It’s all about information sharing, you know, you might take one or two stories that … you always pick up something different from somebody else … different learning styles, different talking styles.

These interactions also give students an insight into how they may progress their own careers. In providing a before and after story of both career and identity, the industry professionals were giving students an insight into identity formation and how it expands over time. Monica (age 20) enjoyed the visits by the industry professionals and said that ‘seeing what sort of standard they were at … that made me think, oh I should be like that’. The interaction provided both the motivation for Monica to forge her own identity as well as providing an example of how other aviator’s professional identity had expanded over the course of their career.

**Concluding remarks**

Utilising the CoP indicators of community, practice, meaning and identity and brokering connections we examined how MATES CoP fosters students’ professional development through their engagement in social practices. The experiences of this group of students were similar to those of the flight leaders. The flight leaders, due to their level of involvement and investment had reflected more on their experiences of how MATES CoP had contributed to their sense of competence and professional identity. Nevertheless, the broader student cohort’s involvement with MATES CoP had provided them with a sense of belonging that appeared to contribute to their developing identity. Engaging in meaningful practice with peers both enhanced their knowledge of the aviation industry
and contributed to their burgeoning identity as a novice professional. Wearing the uniform added significantly to student's sense of identity and competence. They developed a sense of professional identity and confidence that in turn facilitated a smoother transition into flight training. Engaging with industry professionals gave the students insight into life in the broader aviation community as well as continuing to develop their sense of competence through familiarity with the industry language. Students were thus beginning their peripheral participation in the broader community and also continuing to develop their professional identity.

Mates CoP is significant in that it is largely student run and the peer on peer relations facilitate student’s development of knowledge, skills and identity. As the experiences of the broader student body were similar to those of the student leaders, we argue that the student led model is indeed useful for other undergraduate programmes with a vocational focus. Further research might explore if the students involvement in MATES CoP translates into a successful transition into the workforce.
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