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Aligning Metaliteracy with Self-directed Learning to Expand Assessment Opportunities

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■ Abstract

Metaliteracy is a holistic model that emphasises information-related knowledge attainment whilst challenging individuals to take charge of their learning strategies and goals. It prepares learners to become informed consumers and responsible producers of information. Metacognition is a core concept in metaliteracy, just as it is in SDL and in methods of assessment appropriate to SDL, such as AaL and AfL. This congruence provides clear avenues for using metaliteracy's framework in ways that support SDL. The first part of the chapter explores metaliteracy and its connections with SDL and assessment. The remainder of the chapter provides two examples of how the intersection of metaliteracy, SDL and assessment might be addressed in practice. These case studies provide additional and practical connections that might suggest applications in other settings. The first section explores a comprehensive metaliteracy digital badging system that is designed to advance SDL, with a focus on how the self-directed unit from this system was adapted for use in an open textbook. The final section of the chapter provides an example of how an online undergraduate course intertwines metaliteracy, information literacy and editing on Wikipedia, exemplifying principles of SDL and providing examples of AaL and AfL.

■ Introduction

Metaliteracy is a pedagogical framework that prepares individuals to be empowered and self-directed learners to actively create meaningful content and participate constructively in social information environments (Jacobson & Mackey 2013; Mackey & Jacobson 2011). Metaliteracy's emphasis on the four learning domains – affective, behavioural, cognitive, and metacognitive – provides strong links with SDL, AfL and the related AaL. The metaliteracy goals and their associated learning objectives, roles and characteristics provide additional connections. Whilst focused synergies will be examined in this chapter, it is worth noting that if an individual strives to be metaliterate, they are per definition a self-directed learner who takes responsibility for their own learning.

There is no academic major, no certificate programme, no continuing education course that employs instructors to teach individuals to be metaliterate and certify them as such when the programme has ended. Nor is the goal of being a metaliterate learner an activity with a finite end. Rather, becoming metaliterate is a lifelong quest that requires commitment in the face of changing modes of participation, and frequent transformations in the opportunities and platforms for information creation, sharing and collaborative engagement. Becoming metaliterate is a lifelong practice of SDL, reinforced by the metaliteracy framework and a wide range of open educational resources (OERs). A central figure to SDL is Malcolm S. Knowles (1975), who provides the following classical definition of the concept:

SDL is 'a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies and evaluating learning outcomes'. (p. 18)

Hence, this process is student-centred and the teacher acts in a facilitator's role. In this regard, there is a distinct move from teachers being facilitators rather than transmitters of learning (Loeng 2020; Robinson & Persky 2020).

This chapter will explore and make explicit the interconnections between metaliteracy and SDL, and identify the assessment methods most appropriate for determining one's progress towards metaliteracy. Finally, this chapter concludes with two examples from the United States of America describing how the intersection of metaliteracy, SDL and assessment might be addressed in practice.

■ The metaliteracy framework

Metaliteracy prepares learners to become active and informed consumers and ethical producers of information (Jacobson & Mackey 2013; Mackey & Jacobson 2011). Metaliterate learners mindfully reflect on their learning and define the direction of their ongoing intellectual development (Mackey & Jacobson 2014). They assess what and how they learn to advance SDL that is reinforced by the metaliteracy model.

As originally conceived (Mackey & Jacobson 2011):

Metaliteracy promotes critical thinking and collaboration in a digital age, providing a comprehensive framework to effectively participate in social media and online communities. It is a unified construct that supports the acquisition, production, and sharing of knowledge in collaborative online communities. (p. 62)

■ Introducing the framework

Through this framework, individuals hone their abilities to think critically and adapt to social settings that are often mediated by emerging technologies. As part of this dynamic process, individuals learn to continuously evaluate all forms of information through evolving media formats, whilst also understanding that they are empowered to produce and share knowledge in a multitude of collaborative and connected spaces. In these social settings that rely on contributions from participants (Mackey & Jacobson 2014):

[*M*]etaliteracy expands the scope of how to use these spaces as individuals and requires a critical perspective that reflects on the networked environment itself and how knowledge is produced and shared. (p. 4)

The *meta* prefix in metaliteracy signals the key themes that define this pedagogical framework (Mackey & Jacobson 2014). Metaliteracy is closely aligned with metacognition as introduced by Flavell, who argues for a reflective process that generates insights for individuals about their thinking whilst allowing them to self-regulate or control their learning (Flavell 1979). As Flavell (1979) argues, metacognition:

> [*C*]ould someday be parlayed into a method of teaching children (and adults) to make wise and thoughtful life decisions as well as to comprehend and learn better in formal educational settings. (p. 910)

This vision for metacognition indicates how reflection supports individuals in generating new insights about their thinking and preparing them to take charge of their learning. As Flavell argues, metacognitive reflection supports improved learning in formal instructional environments whilst also becoming a part of one's lifelong journey. As a key part of the metaliteracy framework, metacognition is empowering because it shifts the emphasis 'beyond rudimentary skills development and prepares students to dig deeper and assess their own learning' (Mackey & Jacobson 2014:13).

The *meta* prefix in metaliteracy suggests part of the Greek meaning of the word, that of *after* or *beyond* (Lexico 2020). Whilst literacy is generally associated with reading and writing, and traditional definitions of information literacy emphasise search, retrieval and evaluation, metaliteracy scaffolds learning by building upon these abilities to advance active participation and the production of new knowledge. The *meta* prefix also suggests a higher level of abstraction, such as a *metalanguage* (Lexico 2020), denoting metaliteracy as a comprehensive framework rather than a linear or hierarchical skill set. In many ways, metaliteracy is a model that is *about* literacy and that encourages learners 'to understand their existing literacy strengths and areas for improvement and make decisions about their learning' (Mackey & Jacobson 2014:2). In this context, individuals strive towards higher-level awareness about their learning through a nonlinear and decentred model rather than a formulaic set of skills or outcomes (Mackey & Jacobson 2014:91–92). Metaliterate learners who develop 'his or her own metacognitive perspective will find that the flexibility so often found in real-world situations fits easily within this framework' (Mackey & Jacobson 2014:92).

Metaliteracy reinforces SDL with an emphasis on student agency and continual reflection and growth. Metaliterate learners are encouraged to 'critically self-assess different competencies' through metacognitive reflection (Mackey & Jacobson 2014:2). Gaining a self-awareness of one's own literacy through self-reflection is essential to metaliteracy because metaliterate learners 'critically evaluate and understand their knowledge as individuals and participants in social learning environments' (Mackey & Jacobson 2014:14). In doing so, the self-assessment process varies depending on an individual's

existing knowledge and learning goals and does not always follow the same prescribed pathway. The flexibility of this approach means that individuals who 'apply principles of the metaliteracy model in practice will find that the objectives can be met in a variety of different ways, depending on the learning context' (Mackey & Jacobson 2014:92). This variation mirrors Gibbons' (2002:111) observation on the SDL sequence of activities more generally, '[t]he criteria of success, just like the tasks that they are pursuing, vary from student to student'.

The core components of metaliteracy

Metaliteracy is a holistic model that emphasises information-related knowledge attainment whilst challenging individuals to take charge of their learning strategies and goals (Mackey & Jacobson 2014). In order to achieve this comprehensive approach, the metaliteracy model integrates four core components that include the learning domains, learner roles, characteristics and the related goals and learning objectives (Mackey, Jacobson & O'Brien 2020).

Learning domains

The learning domains are central to the metaliterate learner and recognise that individuals embody multiple spheres of learning and knowing (Jacobson, Mackey & O'Brien 2018; Mackey & Jacobson 2014). Bloom's Taxonomy originally included three specific learning areas, including 'the cognitive, the affective, and the psychomotor domains' (Bloom 1956:7). The metacognitive dimension was added to Bloom's classification system for the design of learning objectives in a later revision (Krathwohl 2002:214). As a pedagogical framework, metaliteracy builds a foundation for SDL through all four domains that include the affective (feelings and attitudes), behavioural (skills and actions), cognitive (thinking and knowing) and metacognitive (reflective and self-regulating). The affective domain addresses a person's emotions and attitudes that deepen comprehension about how they may perceive an information situation or context. Being aware of the affective domain prepares learners to investigate feelings and beliefs to analyse the impact of this domain on their thinking and actions. The behavioural domain emphasises the competencies that learners acquire through learning activities. Traditional definitions of information literacy tend to emphasise primarily skills development as reinforced through learning outcomes (American Library Association 2000). From a metaliteracy perspective, the behavioural domain is understood within the context of all four domains so that learners build upon skills and gain new ones through reflection, thinking and action in a connected world of information.

The cognitive domain focuses on an individual's thinking and knowing. Similar to the behavioural domain, the cognitive area often involves learning outcomes that advance skills and actions. Metaliteracy reinforces these important intersections but also considers a learning dynamic that encompasses all four areas. Pivotal to this model is the metacognitive domain that sparks reflective insights about one's thinking, feelings and actions whilst supporting individuals in taking charge of their learning. According to John H. Flavell, metacognition provides 'opportunities for thoughts and feelings about your own thinking to arise and, in many cases, call for the kind of quality control that metacognitive experiences can help supply' (Flavell 1979:908). This is an empowering concept for self-directed learners because reflection increases understanding about the cognitive and affective aspects of learning whilst also supporting the ability to analyse and discern quality in thought and action. Through this approach 'metaliterate students will be prepared to fill the gaps in learning and develop strategies for understanding more than what we, as teachers, present or discuss' (Mackey & Jacobson 2014:13). The ongoing assessment of individual goals and progress that is gained through reflection provides learners with the capacity to self-regulate their learning.

By framing the learning process through four interrelated domains, metaliteracy encourages individuals to see how they learn and grow in these different areas. This unified approach to teaching and learning demonstrates how the four domains are both interrelated and integrated. For instance, learners may not necessarily be encouraged to explore their emotional response to information, but these affective insights are valuable. For example, to avoid *confirmation bias*, which is 'seeking out and interpreting data in a way that strengthens our preestablished opinions' (Sharot 2017:22), it is critical to investigate one's feelings and attitudes about information and related issues. This requires metacognitive reflection and the cognitive ability to be objective in research and to seek out multiple perspectives as part of this process. This approach to critical inquiry values the ability to identify and think outside of one's own perspective or viewpoints. In addition, a person's affective response to a particular topic or concern may be a motivating factor to conduct an objective research inquiry to inform action. Imagine the individual who feels so strongly about climate change, for instance, that this emotional connection to the topic is a motivating factor to embark upon critical inquiry. As Flavell (1979:906) suggests, metacognition also provides awareness about the beliefs that learners have regarding their learning. Metaliteracy supports SDL by foregrounding the relationships amongst the four domains so that learners assess their educational needs and achievements from these associated perspectives.

■ Learner roles

The metaliterate learner roles are central to this framework because these responsibilities provide a real-world context for SDL. The learner roles are defined as a way to unify the different components of the metaliteracy model because 'the domains are fluid, representing a comprehensive and interrelated set of goals and learning objectives that lead to empowering roles' (Mackey & Jacobson 2014:91). Paulo Freire's central critique of what he describes as the banking model of education makes clear that learners are not empty vessels to be filled with deposits of knowledge by teachers (Freire 2000:72). He argues that '[w]hereas banking education anesthetizes and inhibits creative power, problem-posing education involves a constant unveiling of reality' (Freire 2000:81). As active participants in social settings, metaliterate learners do not simply gain skills by achieving outcomes alone, and instead envision themselves in real-world roles and scenarios. Each of these responsibilities relates in one way or another to the evaluation, production and sharing of information (Mackey & Jacobson 2014).

Metaliteracy provides a context for the development of SDL and OERs that supports the reflection upon the roles that individuals may already play as well as those responsibilities that are new to them (Jacobson et al. 2018). Metaliterate learners engage with these ideas and resources to improve upon the roles they identify with whilst striving towards new responsibilities as well. These roles are applicable to teaching and learning scenarios that promote active metaliterate learning. In one example, for instance, Professor Sally Friedman of the Political Science Department at the University at Albany developed a reading assignment for learners to reflect on the active roles they play (Jacobson & Friedman 2019). In another example, a set of questions have been designed to apply the learner roles in a variety of educational settings (Jacobson et al. 2018). The learner roles have been applied in three different Massive Open Online Courses (MOOCs), including a connectivist MOOC and two xMOOCs to support student agency in these environments (O'Brien et al. 2017). The metaliterate learner roles are central in the Coursera MOOC *Empowering Yourself in a Post-Truth World* that reinforces the learner as producer role in particular for a culminating project that requires the creation of a digital artefact (Mackey 2020).

The central metaliterate learner role is producer, because it signals the crucial shift from consumer to creator of information. Robert Scholes (1985) argued that the academic boundaries between consumer and producer need to be better understood because reading itself is 'not simply as consumption but as a productive activity' when learners make meaning through this process and refer back to 'prior texts' as a continuous and critical learning activity

(Scholes 1985:8). As text evolved to hypertext, George P. Landow (1992) envisioned a collaborative space that shifts the consumer to be a producer because individuals make decisions about which pathways to pursue through linked documents as 'newly empowered, self-directed students' (Landow 1992:120). In his original design for the Web, Tim Berners-Lee (2000) emphasised the importance of a hypertext editor because he envisioned 'an intimate collaborative medium' although he realised that it initially became more of a means for the publication of documents (Berners-Lee & Fischetti 2000:57).

The metaliteracy framework empowers learners to responsibly produce and share content in participatory environments (Mackey & Jacobson 2011, 2014). The learner as producer role takes into account the interconnected aspect of collaborative media and prepares learners to adapt to these social technologies. This pivotal responsibility supports related roles such as the researcher who engages in a process of critical inquiry to assess and create information and the communicator who effectively conveys ideas and engages with others in social settings. The communicator role is closely aligned with the participant who understands social contexts and contributes to communities in a meaningful way. This responsibility benefits from an awareness of the collaborator role so that learners conscientiously work with others in these connected spaces. Metaliterate learners are translators who adapt ideas from one artistic form to another or who create media across different platforms. Through this process, individuals are authors who not only write text documents but also gain the ability to author digital projects by combining text, image, sound and video elements.

As a producer of dynamic information, learners also need to understand the contexts and responsibilities associated with publishing content. Through the publisher role, learners actively write, edit, produce and remix information for external audiences. This process necessitates an awareness of how to share content through a publishing medium such as a blog, wiki, social media platform or independent website. It also requires an understanding of how to properly identify and attribute digital materials that are openly licensed through a global community such as the Creative Commons. Additionally, publishers make decisions regarding how to license their own work. As part of this shared process in producing and publishing information in participatory settings, 'the learner is also a teacher and each individual is a collaborative partner in the learning experience' (Mackey & Jacobson 2014:13). This is an especially empowering insight for self-directed learners who assess and regulate their learning with the purpose of expanding their knowledge whilst sharing it with others in connected social settings.

■ Characteristics

As metaliterate learners expand their roles through the lens of the four learning domains, they strive towards specific metaliteracy characteristics (Mackey 2019). These attributes align closely with the learner roles and define specific qualities to aspire to as part of the learning process. The *productive* characteristic is gained through the active creation of dynamic content in collaborative communities. Individuals learn to be *reflective* about what and how they create information whilst being ethical and responsible in doing so. These qualities require the *collaborative* characteristic to support the co-creation of knowledge as a purposeful social activity. Being *participatory* is a related attribute that learners aspire to as they understand the environments within which they engage and the attendant issues or concerns when doing so. In social media environments, for example, individuals need to be aware that misinformation and disinformation easily circulate without authoritative editorial mechanisms. Considering the ongoing changes in technology, learners must be critically *adaptive* to new systems whilst asking good questions about the influence of proprietary platforms and bad actors within these spaces. Additional characteristics include being *informed* about the authenticity and reliability of information and *open* to new ideas and different perspectives. In today's divided information environment, metaliterate learners need to gain the *civic-minded* characteristic to reinforce an individual's responsibility to their community (Mackey 2019).

■ Goals and learning objectives

The metaliteracy goals and learning objectives constitute the fourth core component of this comprehensive framework. The four goals include the following (Jacobson et al. 2018):

1. actively evaluate content whilst also evaluating one's own biases
2. engage with all intellectual property ethically and responsibly
3. produce and share information in collaborative and participatory environments
4. develop learning strategies to meet lifelong personal and professional goals.

The four overarching goals are reinforced by several related learning objectives that are identified with the most salient learning domains (affective, behavioural, cognitive and metacognitive). For instance, the first goal about evaluating bias is supported by an affective and cognitive objective to validate the expertise of information and related sources whilst also recognising that experts actually do exist in society. The second goal, to advance responsible engagement with intellectual property, is supported by

a metacognitive objective to reflect on how to ethically incorporate someone else's intellectual property into your own work. The third goal, related to producing and sharing information, is reinforced by the affective and metacognitive objective to envision oneself as both a consumer and producer of information. Lastly, the fourth goal, about developing strategies for meeting lifelong learning goals, is reinforced by a metacognitive objective to value this approach as part of one's lifetime practice. Additional objectives are tagged with either one or combinations of the learning domains to advance metaliterate learning. This open resource is scalable to a multitude of educational settings and has been translated into a number of languages, including Afrikaans, French, German, Italian, Portuguese, Setswana and Spanish (Metaliteracy.org 2019).

Through the core components of metaliteracy, individuals develop the capacity to better understand their active roles for engaging with and producing reliable and responsible information. They gain a new perspective on how they approach learning situations and develop self-directed strategies whilst striving towards the characteristics of the metaliterate learner.

■ Self-directed learning viewed through the lens of metaliteracy

The concept of SDL is not new and has been integral to learning in diverse contexts and is consequently also relevant for metaliteracy. The scholarly engagement with this concept harks back to the work of Lindeman (1926), Houle (1961) and Tough (1968) and a number of works on andragogy or adult education and self-education (Brockett & Hiemstra 2019; Garrison 1997; Gibbons 2002; Loeng 2020; Zhu, Bonk & Doo 2020).

■ Defining self-directed learning

Epistemologically, Loeng (2020:5) situates SDL in what this author calls romantic humanism as it 'emphasizes to a great extent that the human being has the power for personal development'. Whilst Van der Walt (2016) describes SDL as a pragmatic theory with roots in self-determination theory.

A definition for SDL by Malcolm S. Knowles was provided at the beginning of this chapter, but another perspective is provided by Gibbons (2002), who defines SDL as follows:

> SDL is any increase in knowledge, skill, accomplishment, or personal development that an individual selects and brings about by his or her own efforts using any method in any circumstances at any time. (p. 2)

In addition to these definitions emphasising the process aspect of SDL, it has also been described as a learner characteristic that is not dichotomous in

nature but rather occurs dynamically on a continuum (Brockett & Hiemstra 2019; Garrison 1992). Candy (1991) distinguishes between two processes, learner-controlled instruction and autodidaxy, as well as two personal attributes, self-management and personal autonomy, emphasising the relevance of SDL for both informal and formal learning contexts.

Despite SDL's focus on the individual, it by no means implies student isolation or total independence (Candy 2004). In this regard, Brockett and Hiemstra (2019) emphasise that students should take responsibility for their own learning, but that the learning itself can take place within a group. In an SDL context, both teacher as facilitator and peers can play important roles through established learning partnerships (Brockett & Hiemstra 2019). In addition, implementing cooperative learning strategies has been proven to have a positive effect on perceived SDL readiness (Mentz & Van Zyl 2018). Hence, as with metaliteracy, SDL is also closely associated with collaboration in the learning process.

Within the context of this chapter on metaliteracy, the following requirements identified by Loeng (2020:10), in addition to controlling the learning situation, show the intersections between SDL and metaliteracy: 'willingness to reflect, critical judgement, and necessary knowledge of alternatives'.

■ Approaches to self-directed learning

Various authors have provided models and schemes to describe SDL. Firstly, Knowles (1975) provides six steps to developing a learning contract as a means to facilitate SDL in contexts where there are external requirements and where there is a need to align or link these up with students' own needs. In a similar fashion, Gibbons (2002) refers to student learning agreements. Consequently, within the context of metaliteracy, the requirements of this concept can also potentially be reconciled with students' own goals by means of an embedded learning contract or agreement.

Bosch, Mentz and Goede (2019) provide an overview of key models of SDL, including Long's instructional model for SDL, Candy's SDL model, Brockett and Hiemstra's personal responsibility orientation (PRO) model, Garrison's model and Oswalt's model. Brockett and Hiemstra (2019:57) proposed the PRO model to 'recognize both the differences and similarities between SDL as an instructional method and learner self-direction as a personality characteristic'. This model also emphasises personal responsibility and both the learning process and self-direction of the learner as well as wider factors within the social context.

The importance of the online context was evident in the first part of this chapter and consequently SDL also needs to be considered within this milieu.

Self-directed learning and the online environment

The affordances of online environments for SDL are clear. Zhu et al. (2020) note the importance of SDL for successful learning online and specifically in MOOCs. In this regard, Candy (2004) also makes the following observation:

> [A]t least some forms of self-directed learning are particularly suited to the online environment, and indeed many recent technological advances are precisely targeted at supporting independent learning and use, there is clearly merit in exploring the linkages at a practical as well as a conceptual level. (p. 4)

Online platforms provide opportunities for collaboration which can be supportive for SDL (Candy 2004). Such opportunities are also highly relevant as SDL is considered a 'collaborative process between teacher and learner' within a context where '[w]e live interdependently and knowledge is socially determined' (Garrison 1992:141). Again, this potential for collaboration ties in with the requirements of some learner roles within metaliteracy.

An important requirement for SDL, identified by Loeng (2020) is phrased as follows: 'As a self-directed learner, you must have minimum control over the time, pace, and place for learning'. Such flexibility is especially true for online environments where learning can be synchronous or asynchronous, self-paced and accessed from wherever metaliterate learners want to access the relevant learning platform.

Furthermore, as the focus of this chapter is also specifically on the role of assessment, within the intersections of metaliteracy and SDL, the concept is also explored further.

Self-directed learning and assessment

Central to learning is assessment and the same applies to SDL. In this regard, Gibbons (2002) highlights the relevance of student self-assessment as an essential skill for SDL. Mok (2009:11) approaches assessment in terms of SDL through the concept of 'SLOA'. Furthermore, Lubbe and Mentz (2019) have found that participative assessment practices can contribute to developing SDL skills. Hence, both in terms of metacognition and a participative approach, clear links can be identified between both SDL and metaliteracy. In addition, Costa and Kallick (2004) advocate for assessment to be in support of SDL and that assessment strategies increasingly contribute to student agency. Ideally, within an SDL context, students should take charge when it comes to what and how assessment takes place. The importance of assessment throughout the whole SDL process is explained by Gibbons (2002) as follows:

> [S]tudents should be learning to think about and assess the whole learning sequence: what they have chosen to learn, the process they are following to complete the

tasks they have chosen, the success with which they are applying their energies to the tasks, and the quality of the results they achieved. (p. 111)

From this statement, the metacognitive role of assessment and the centrality of student agency in terms of assessment is evident. The remainder of the chapter explores the ways in which SDL and assessment can be integrated with metaliteracy's core components.

■ Integrating self-directed learning and assessment with metaliteracy's core components

This section focuses on the connections between metaliteracy's core components (particularly the four learning domains and select associated learning objectives), SDL and assessment, with an emphasis on AaL. Pertinent to this exploration is the notion of SDL as both a process and as a learner characteristic (Brockett & Hiemstra 2019; Garrison 1992). Metaliteracy is a pedagogical framework that advances several characteristics that reinforce SDL. The flexibility of the learning domains and roles provide real-world context for self-directed learners to actively engage.

■ Affective learning domain

Metaliterate learners are prompted to recognise the presence and impact of the affective domain. The affective learning domain addresses how one feels when learning, and how that feeling influences learning. Pekrun and Linnenbrink-Garcia (2014:1) note, with an emphasis on learner self-direction, that '[e]motions are both *experienced* in the educational setting as well as *instrumental* for academic achievement and personal growth'. Learning may be hindered when negative feelings that might be overcome are not even noted.

The affective domain also contributes to motivation, such as when learners celebrate strides they have made. In fostering SDL, it is essential to promote enthusiasm and positivity towards students being actively involved in the learning process (Gibbons 2002). Garrison (1997) emphasises the importance of the motivational dimension in his model of SDL. It is important to recognise that '[m]otivation plays a very significant role in the initiation and maintenance of effort toward learning and the achievement of cognitive goals' (Garrison 1997:26). In this context, both *entering motivation* which relates to students wanting to start and *task motivation* which pertains to staying on task and continuing (Garrison 1997) are pertinent. Zhu et al. (2020:2087) emphasise the importance of motivation for SDL in an age of increased online learning and they state that 'the learner must have sufficient motivation, whether intrinsic and extrinsic or some combination thereof, to find, explore, and use the learning platforms made available to them'.

A further relevant aspect in terms of motivation is SRL. The relationship between SDL and SRL is clear from the literature (Garrison 1997); however, they are distinct concepts (Robinson & Persky 2020). In this regard, the scholarship on SRL provides insights in terms of how motivation plays a role in learning, specifically also in terms of self-efficacy and relates to a focus on affective, cognitive and behavioural processes (Robinson & Persky 2020). Motivation contributes to SRL and exists in a dynamic relationship, and furthermore, SRL is positively related to self-efficacy (Pintrich 1999). Importantly, metacognitive experiences can also have an effect on motivation within the SRL context (Efklides, Schwartz & Brown 2018). All these aspects also have an influence on assessment for and as learning as part of the SDL process. With regard to online classes, Darby focuses on Brockett and Hiemstra's (2019) interpretation of SDL. Darby writes, 'we have a powerful tool to fight for online student attention, engagement, and persistence: emotions' (2020). Similarly, Zhu et al. (2020) have indicated the importance of SDL within the context of MOOCs.

It should be considered that '[p]ositive emotions, such as enjoyment of learning and pride, have been linked to intrinsic motivation and interest in students across all ages, including college' (Oades-Sese et al. 2014:247).

In terms of motivation within the learning context, teachers as facilitators also have a role to play. Gibbons (2002) makes the following observation regarding the teacher's roles regarding motivation:

> [T]he teacher must motivate students to take on the task of managing their own activities and must then teach them to motivate themselves as an essential aspect of continuing self-direction. (p. 93)

It is clear that students have different levels of SDL and motivation at the start and throughout the learning process. Consequently, support or even interventions might be relevant on the side of teachers. One way that this might be done is by teaching and modelling metaliteracy. Learners who are aware of their feelings about and whilst learning are able to recognise when those feelings are hindering motivation, hampering SRL. The metaliteracy goals and learning objectives include pertinent items. Given the varying impacts of affect, some of these learning objectives are written neutrally. Two learning objectives address the need to 'develop learning strategies to meet lifelong personal and professional goals' (goal 4). These two objectives, which are both affective and behavioural, implicitly acknowledge the effort of staying current as a part of SDL (Jacobson et al. 2018):

- Adapt to new learning situations whilst being flexible about the varied approaches to learning.
- Adapt to and understand new technologies and the impact they have on learning.

Assessment as learning has an important role to play in striving towards the learning objectives. Earl (2013:28) describes it as follows: 'Assessment *as* learning is a subset of assessment *for* learning that emphasizes using assessment as a process of developing and supporting metacognition for students,' which will be considered in the Metacognitive Learning Domain section. However, it should be noted that this assessment may be swift when working towards these two learning objectives, as they are behavioural as well as affective. Not fully succeeding may bring forth frustration (affective) and also the realisation that one has not mastered the adaptations as put forth (behavioural).

A positive climate can be considered nurturing towards student productivity and ultimately also SDL (Gibbons 2002). This aligns with an objective from goal two, 'engage with all intellectual property ethically and responsibly'. This objective, which is metacognitive as well as affective, exhorts metaliterate learners to 'challenge yourself to formulate ethical and novel approaches to build upon the ideas of others that you find exciting and engaging' (Jacobson et al. 2018). Addressed in the positive climate Gibbons describes, it has the potential to inspire creative productivity, which in turn may lead to enhanced motivation.

Another objective, which is affective, behavioural and cognitive, is 'recognize that learners are also teachers and teach what you know or learn in collaborative settings' (goal 3). This objective foregrounds a role, Teacher, and accompanying opportunity that is within reach through SDL. This aspect also ties in with the view by Knowles (1975) that others can act as human resources in the SDL process and that peers can play an important role in the learning process (Brockett & Hiemstra 2019). One can aspire to expertise in a particular area whilst continuing to learn in others. This recognition of motivation in directing one's own learning can lead to a pride of mastery.

▪ Metacognitive learning domain

The idea of the learner as teacher epitomises the empowering and SDL aspects of metaliteracy. As a learning objective, individuals are encouraged to recognise their roles as teachers when sharing their knowledge in collaborative environments. This objective supports an overarching goal to produce and share information collaboratively, which is another core concept of the metaliteracy framework.

Metaliteracy encompasses roles beyond simply that of the teacher and requires mastery of additional learning objectives. Determining when one might be ready to teach others requires engagement with learning domains beyond the affective. An individual must reflect on what they do or do not

know (metacognitive learning domain), develop a plan to fill gaps (cognitive) and then take the steps necessary to fill those gaps (behavioural).

The AaL that individuals undergo as preparation to teach others may emanate from formal or informal SDL initiatives, or from learner self-direction. However, learners must recognise the value of such assessment and engage in it for themselves as needed. In the case of the learner as teacher, the assessment may produce feedback swiftly. Is the person being taught understanding? Grasping the content? The individual who is serving as teacher may reflect on the experience, in the moment or subsequently, and recognise gaps to address or be further motivated by successes. Or both. Peer review is also appropriate at times when learners are serving as teachers. In the process of assessing each other's work, students also take on the role traditionally associated with teachers.

Apart from the prominence of metacognition for metaliteracy, metacognition is also essential for SDL. The commonly cited definition of metacognition comes from Flavell (1976:232), where it is regarded as 'one's knowledge concerning one's own cognitive processes and products or anything related to them'. This definition ties in well with the metaliteracy idea of student as producer and hence students in this context should be aware of the processes and products involved.

It is clear that metacognitive strategies can have a positive influence on students' self-direction (Breed & Bailey 2018; Evans 2018; Mariano & Batchelor 2018). Different strategies have been proven to support metacognition including cooperative, process-oriented and problem-based learning (Breed & Bailey 2018; Mariano & Batchelor 2018). When it comes to assessment, the affordances for SDL in embedding metacognitive strategies within assignments are evident (Kincannon, Gleber & Kim 1999). In this context, Evans (2018:4) also advocates for 'appropriate learning experiences and environments that support open-ended learning so as to balance autonomy, ambiguity, and student motivation'.

This chapter has discussed the learning objective 'See oneself as a producer as well as consumer of information' in support of goal three to 'produce and share information in collaborative and participatory environments' in connection to the learner roles (Jacobson et al. 2018). This objective involves both the metacognitive and the affective learning domains. Gibbons (2002) recognised the importance of assessment during the full SDL process. In connection with the learner as producer role and learning objective, a learner's reflective assessment of an information product will provide feedback on the quality of the result and, in the realm of the affective domain as well as the metacognitive, the success of their engagement in the learning process.

When a learner is producing non-disposable or renewable assignments (NDA), those that have a life beyond assessment by the instructor, they are often more engaged and excited. Seraphin et al. (2019:86) review the literature on NDAs, which provide evidence that they 'build intrinsic motivation and consistently promote self-directed productivity'. Seraphin et al. (2019) add:

> [C]ultivating intrinsic drives […] through the production of work that is perceived to be meaningful and valuable may yield greater classroom achievement and learning productivity as well as enhanced well-being, among other self-reflective evaluations […]. (p. 186)

Metacognition is a core concept in metaliteracy, just as it is in SDL and AaL. This congruence provides clear avenues for using metaliteracy's framework in ways that support SDL.

■ Cognitive learning domain

The cognitive learning domain lends itself to AfL over time, particularly because striving to be metaliterate is a continuing process. Importantly, '[a]ssessment for learning shifts the emphasis from summative to formative assessment, from making judgments to creating descriptions that can be used in the service of the next stage of learning' (Earl 2013:27). Hawe and Dixon (2017:1182) differentiate between AfL and formative assessment through the emphasis in AfL on learning and the role of the learner. This check-in on learning might be done in a course setting (Costa & Kallick 2004):

> Constructivist teachers realize that cognitive growth occurs when individuals revisit and reformulate a current perspective. Therefore, teachers provide data, present realities, and pose questions for the purpose of engendering contradictions to students' initial hypotheses, challenging present conceptions, illuminating another perspective, and breaching crystallized thinking. (p. 81)

Students may also initiate exploration. Examples of cognitive metaliteracy learning objectives that have the potential to encourage learners to actively consider, analyse and evaluate emanate from several goals. The following objectives reflect both the cognitive and the behavioural domains (Jacobson et al. 2018):

• Learning objective 8 from goal 1: Evaluate user-generated information in social media environments and differentiate between opinion and fact.
• Learning objective 5 from goal 3: Translate information presented in one manner to another in order to best meet the needs of a particular audience.
• Learning objective 7 from goal 4: Effectively communicate and collaborate in shared spaces to learn from multiple perspectives.

These learning objectives exemplify the constructive process of knowledge production that Costa and Kallick (2004) describes:

> Knowledge is a constructive process rather than a finding. It is not the content stored in memory but the activity of constructing it that gets stored. Humans don't get ideas; they make ideas. Meaning making is not just an individual operation. The individual interacts with others to construct shared knowledge. There is a cycle of internalization of what is socially constructed as shared meaning, which is then externalized to affect the learner's social participation. (p. 118)

As the dual-domain nature of these three learning objectives indicates, the behavioural learning domain is often inextricably connected with the cognitive. In order to show that learning has taken place, often an action needs to be performed, one that might be assessed. Therefore, it is appropriate to transition to this last of the four learning domains.

■ Behavioural learning domain

The behavioural domain might usefully address both teacher behaviour and student behaviour. Beginning with the behavioural learning domain's connection with SDL in regard to the former, Gibbons (2002) emphasises the role of teachers modelling SDL behaviour themselves in order to contribute to the motivation of students. This scaffolding, whilst contributing to behavioural efficacy, also has the potential to address the affective component of learning. Learners who are hesitant about how to proceed now have an example to follow. This modelling should include examples of how to resolve difficulties, so that through their actions students can 'be proud of their ability to identify and resolve the difficulties they confront' (Gibbons 2002:101). It should also show students how to (Gibbons 2002):

> [7]hink about and assess the whole learning sequence: what they have chosen to learn, the process they are following to complete the tasks they have chosen, the success with which they are applying their energies to the task, and the quality of the results they achieved. (p. 111)

Once students have learned how to follow a path of SDL, they will incorporate behaviours that enhance their goal of being a metaliterate learner, such as addressing those learning objectives listed in the cognitive domain section above. Strengthening individual characteristics will involve a range of assessment methods, often ones that include peer as well as self-review.

■ Metaliteracy, assessment and self-directed learning in action

The remainder of the chapter provides two examples of how the intersection of metaliteracy, SDL and assessment might be addressed in practice. These case studies provide additional and practical connections that might suggest applications in other settings. The first section explores a comprehensive metaliteracy digital badging system that is designed to advance SDL. Particular

attention is focused on the self-directed challenge from this system and how it was adapted for use in an open textbook. The final section of the chapter provides an example of how a credit-bearing online undergraduate course intertwines metaliteracy, information literacy and editing on Wikipedia, exemplifying principles of SDL and providing examples of AaL and AfL.

■ Adapting a self-directed digital badging challenge to educational planning

The metaliteracy digital badging system is an interactive competency-based resource that is organised around a constellation of metaliteracy concepts. Learners pursue quests, challenges and content badges in a scaffolding of activities that ultimately lead to four master badges: Master evaluator, producer and collaborator, digital citizen, and empowered learner (Metaliteracy. org 2014). This interactive environment engages learners with the content and leads to the completion of this work through specific writing assessments or short media projects. These activities are completed individually or through the guidance of an instructor or librarian associated with a disciplinary course at the University at Albany, SUNY (O'Brien 2018). The content for this system has been developed by a number of authors, including faculty and students, and is available as an OER that is available to everyone through a Google Sites website (Metaliteracy.org 2014).

The self-directed challenge discussed in this section was adapted from the original badging content for a Lumen Learning open textbook developed by Dr Susan Oaks, who is a Professor at SUNY Empire State College (Lumen Learning n.d.a). This repurposing of the challenge for the open textbook supports a required course at the college in Educational Planning that all students take to design their unique degree concentrations. This is an ideal application of this badging challenge because degree planning at SUNY Empire State College is a reflective process in which self-directed learners work individually with a mentor to design their program of study (Herman & Mandell 2004). This requires students to assess their transcript credit, determine if their life experience should be evaluated for college credit through prior learning assessment (PLA) and then combine these elements with new studies to develop a unique degree programme. As Herman and Mandell argue, 'Educational planning, including PLA, not only opens the academy to non-traditional students; it opens the academy to non-traditional learning' (Herman & Mandell 2004:110). In the context of the Educational Planning course and open textbook, the competency-based digital badging challenge supports students in fostering self-direction as they engage in the degree planning process (Lumen Learning n.d.b).

As seen through this descriptive analysis, the self-directed challenge is adaptable as a single unit, which allows it to be developed as a learning activity for the open textbook. It is also organised as part of the original badging system and open website that includes four high-level badges, including a top-level metaliteracy badge that requires achieving all of the others. According to Information Literacy Librarian Kelsey O'Brien (2018), who designs and manages this system and site:

> Metaliteracy places the emphasis on the learner by fostering learner agency, ownership and identity. Likewise, the Metaliteracy Badging System is oriented around the metaliterate learner. Both in content and structure, the system guides students as they explore their roles as empowered learners and contributors, reflecting on their own thinking and learning processes and recognizing their achievements as the fruition of both their successes and failures. (p. 186)

In this context, the pursuit of digital badges enacts metaliteracy through creative and inventive learning activities that are powered by the metaliteracy goals and learning objectives. Central to this process is metacognitive reflection that allows for meditative thinking and awareness about one's own knowledge discoveries and individualised learning through the badging journey. By cultivating learner agency, metaliteracy reinforces a key dimension of SDL that plays out as participants achieve competencies through the quests, challenges and content badges.

The badging content is built on a foundation provided by metaliteracy's core components especially related to metacognition and the learner as producer role. The influence of metaliteracy plays out in the design of the interrelated materials as well, including the embedded quests and challenges. The self-directed challenge is part of the metacognitive reflection quest and leads to the Empowered Learner badge. The badge activity reinforces the importance of reflective thinking and illustrates how learners may struggle along the way whilst ultimately learning from the experience. According to O'Brien, this foregrounding of the learning process in the badging exercises, including potential difficulties along the way, will 'cultivate an underlying mindset that helps students develop resilience as researchers and learners' (O'Brien 2018:192). In this environment, learners continually reflect on a series of question prompts and written responses, whilst gaining insights about their own thinking and learning.

The self-directed challenge explores how individuals learn through activities that take place in academic and lifelong learning settings. It reinforces the idea that metaliterate learners teach themselves and also teach others in collaborative learning spaces. The challenge presents these ideas by providing a description of multiple learning scenarios and references the definition of SDL by the renowned scholar in adult learning theory, Malcolm S. Knowles (1975). Through this introduction to SDL, individuals gain new insights about their own learning needs and goals in both formal

and informal settings and are asked to consider this perspective in their response. The culminating activity for this challenge asks participants to reflect on their own learning, with questions based on the process outlined by Knowles that encourage them to consider specific scenarios from their own life.

The first set of questions in *Part 1: Individual Reflection* asks learners why they took the initiative as a self-directed learner, how they determined their own learning need, how they designed their own goals for learning, what kind of information was required for this process, how the strategy was implemented and how they evaluated it. In *Part 2: Peer Reflection*, the questions shift the emphasis from individual to peer reflection so that learners contemplate their own self-directed experiences and then reflect on the insights gained from a conversation they initiate with a friend, colleague or teacher. They are asked to write about the outcome from this interview and to think about how this other person's experience with self-direction might influence their own individualised learning approaches moving forward.

The Educational Planning version of the self-directed challenge builds upon this initial exercise with an in-depth learning activity that asks them to identify, analyse and reflect upon a time when they failed to learn something. This activity is prompted by several related questions that encourage individuals to contemplate what they learned by failing rather than succeeding. This in-depth activity engages learners in the idea that people gain knowledge through an ongoing process of trial and error rather than achieving every predefined goal or objective. Overall, this self-directed challenge promotes meditative thinking that is practiced through writing assignments that incorporate both self-reflection and peer reflection. Learners engage with the ideas of a noted scholar, Malcolm S. Knowles, whilst reflecting on their own assessments in relation to insights offered by their peers.

Looking at this badging challenge through the lens of metaliteracy shows how it advances several of the culminating characteristics of the metaliterate learner. Individuals who complete the learning activity are *reflective* by assessing their experience and that of peers. This learning activity is built around the Knowles quote which defines SDL authoritatively, whilst also placing the learner's experience at the centre. Multiple scenarios are presented that spur metacognitive reflection about this theme. In this context, learners are *informed* because in addition to the Knowles reference, learners are asked to study additional resources related to an example of SDL about playing the guitar. Through this example, learners review an online WikiHow page, a YouTube video from a guitar expert and a Coursera MOOC site from the Berklee College of Music that shows a wide range of openly available content about music education from a well-respected academic institution. Within this context, they are *open* to different modes and *adaptable* to digital resources that extend beyond text.

Through their engagement with this badging challenge, learners are *authors*, *communicators* and *collaborators.* They assess and write about their own experience and then document and share these individual reflections by also analysing responses from peers. The exercise promotes a reflective writing process that requires the analysis of scholarly and popular materials and integrates primary sources based on the learner's insights in relation to interviews with peers. Exposure to different formats in one activity supports the assessment of professionally produced academic resources in relation to online materials. Although learners gain the *productive* characteristic by writing up their analysis, they are not necessarily encouraged to produce a multimedia response. Dynamic media options are supported by the larger badging environment with outcomes that extend beyond the written assignment in this challenge.

Although one learning activity is not expected to address all of the metaliteracy characteristics, several are supported through this activity. The *participatory* characteristic is not fully developed because learners submit their individual writing assignments to the instructor, although the overall badging environment is interactive. In addition, the civic-minded characteristic is not a primary focus of this activity either. At the same time, however, the collaborative nature of the required interview with peers does support SDL as an individualised and collaborative process that benefits from shared ideas. The larger context provided by the Educational Planning course includes opportunities for social engagement in the online community.

◼ Developing metaliteracy and self-directed learning in a culture of assessment in an information literacy course

A one-credit information literacy course at the University at Albany, State University of New York was designed to teach both metaliteracy and information literacy using open pedagogy. The course, which is taught asynchronously online, also promotes SDL and uses both AaL and AfL to enhance student mastery and confidence. The course is a mere six weeks long, and thus the moving parts must all be carefully selected and aligned.

Information Literacy for the Humanities and Fine Arts meets the University at Albany's upper-level information literacy general education requirement for students majoring in philosophy, East Asian Studies and Korean Studies, although students in other majors take it as well. Most students who enrol are seniors and have a solid background in traditional library research-related abilities, a more traditional understanding of information literacy. This course asks students to move beyond their comfort zone by conducting research and sharing their results for an entirely different purpose than writing a scholarly

essay for their professor. They select a topic connected to their major field of study to research for the purpose of adding content to Wikipedia, through participation in the Wiki Education programme (WikiEdu n.d.). This NDA provides benefits for readers around the world whilst also asking learners to engage with elements of metaliteracy and to take part in shaping their own learning.

☐ Course expectations and focus

The course syllabus provides a brief introduction to the importance of metaliteracy in the course, including the role of information creator in a collaborative, open and online environment, and also the importance of metacognition. The syllabus also highlights personal attributes that the course hopes students will enhance, attributes that encourage SDL, such as cultivating a growth mindset, accepting challenges and making space for opportunities that promote creativity and exploration, and allow connections and personalisation.

Metaliteracy is both a subject of study within the course as well as scaffolding as the students assume roles in a setting unfamiliar to them. After an introduction to metaliteracy, they focus on the learning domains and the roles. At the same time, they are learning about information literacy as presented in the *ACRL Framework for Information Literacy in Higher Education* (Association of College & Research Libraries 2015). This Framework is clustered around six frames essential for a conceptual understanding of information literacy:

- authority is constructed and contextual
- information creation as a process
- information has value
- research as inquiry
- scholarship as conversation
- searching as strategic exploration.

Students read all of the frames but engage with four in particular. *Information has value* is the first frame they grapple with, selected because the upcoming course project provides an entrée into the topic: Wikipedia primarily reflects topics selected and articles written by white males. There is a need for broader representation amongst Wikipedia editors (as writers are called) and subjects. Our explorations of the value that information can have range far beyond Wikipedia, but this situation informs students as they select their topics. Both the affective and the cognitive learning domains are involved, as students are motivated by the forum discussion and associated class reading.

Searching as strategic exploration is the theme of the following week, which asks students to acknowledge that '[s]earching for information is often

nonlinear and iterative, requiring the evaluation of information sources and the mental flexibility to pursue alternative avenues as new understanding develops' (Association of College & Research Libraries 2015). The following week's theme is a metaliteracy learning goal, *Engage with intellectual property ethically and responsibly,* which encompasses Wikipedia's rules on plagiarism, but also highlights the students' role as information producers. This goal is supported by several objectives that encompass all of the learning domains in support of the ethical production of information.

Information creation as a process, the next frame to be analysed, helps students think about the different expectations of this project compared with the writing they traditionally engage in. Their newfound appreciation of examining how they feel is of particular importance with this frame, as they are decidedly outside their comfort zone learning how to write for Wikipedia. This frame also helps to prepare them for appropriate self- and peer-assessment, as they are moving beyond the confines of scholarly writing, but need to acknowledge that. It also aligns closely with the emphasis of information production that is woven throughout metaliteracy.

Produce and share information in collaborative & participatory environments, another metaliteracy goal, is the theme of the last class of the semester. It reminds students of their obligations as they share their completed content in Wikipedia articles. A fourth frame, *Scholarship as conversation*, is not a weekly theme but does play a role during the second half of the course when students engage in discussion with other Wikipedians and with student peer reviewers. By sharing their knowledge in this way, learners become teachers as they fulfil this key metaliteracy objective in support of producing information in the collaborative environment of Wikipedia.

The open pedagogical approach of this course overlaps with elements of SDL. Gibbons describes seven principles that help to move classes from traditional teacher-directed learning towards student-directed learning (Gibbons 2002:43–45):

- teach students the skills they need to take control over their learning activities
- shift the emphasis of the program from content to productivity
- introduce new practices in gradual gradients of complexity
- make new ideas familiar with connecting them to students' lives
- develop in students the attitudes necessary for success
- change from telling to asking, from lecturing to interaction
- launch the student on a hero's journey of discovery.

Table 4.1 puts each theme in the context of information literacy (IL), the associated metaliteracy learning (ML) domains and roles, highlights elements of SDL per Gibbons and notes assessment that occurs in connection with that theme.

TABLE 4.1: Interconnections between metaliteracy, self-directed learning and assessment.

Weekly IL frame or ML goals	ML domains	Roles	SDL (per Gibbons 2002)	Assessment
Introduction to ML and IL	Cognitive Metacognitive	Participant (class forum)	Introduction to new attitudes	Self-reflection on ML
Information has value	Affective Cognitive Metacognitive	Communicator Researcher Participant (class forum)	Exploration of theme based on their experiences, interests	Peer responses to posts in the class forum
Searching as strategic exploration	Behavioural Cognitive	Researcher	Gradients of complexity based on Wikipedia requirements	Instructor feedback on submitted sources
Engage with intellectual property ethically and responsibly	Behavioural Cognitive	Producer	Gradients of complexity	–
Information creation as a process	Cognitive Metacognitive	Author Translator	Shift from content to productivity	–
Produce and share information in collaborative and participatory environments	Behavioural Cognitive	Producer Participant Communicator Author	Shift to productivity and interaction Launch on a journey of discovery	Possible evaluative response from Wikipedia community Metacognitive reflection on ML's roles of author and participant Self-assessment using course rubric Metacognitive response to metaliteracy
Scholarship as conversation (carries over several weeks)	Affective Behavioural Cognitive Metacognitive	Communicator Collaborator	Attitude development	Peer review within and outside the class Possible Wikipedia community review

SDL, self-directed learning; IL, information literacy; ML, metaliteracy learning.

☐ Spotlight on self-directed learning and assessment

This course contains major components of SDL but is hampered by the brief time span available to develop the full environment associated with this form of learning. Per the first principle proposed by Gibbons (2002), teaching students the skills needed to take control of their own learning, students are throughout the course working through tutorials provided by the Wiki Education programme. These tutorials have accountability attached to them: the course dashboard tracks their completion of each tutorial and prompts the instructor to determine whether reminders should be sent to students

who have not yet completed any tasks that are overdue. There are no grades associated with completion. However, students will struggle in the live Wikipedia environment if they have not learned what they contain. There is the potential that students will recognise the importance of the tutorials, and therefore develop an appreciation for resources that will help them to succeed when they are engaged in SDL.

Regarding Gibbons' second and third bullets, student production of contributions to Wikipedia advance in complexity, from adding a citation to an existing article, to leaving comments on a fellow editor's talk page, to creating content that will be incorporated into an existing article (or creating a new one). The *Scholarship as conversation* frame overlaps with this production. Students interact with other community members as a way of becoming situated in the environment, but these members also provide a source of assessment. This occurs in a neutral manner when students ask a question in a platform space for novices midway through the course but can become more personal as students grapple with peer feedback and possible negative feedback from Wikipedia community members. Should negative feedback occur, it calls into play all four learning domains, as students feel rejected, work through their reactions and make decisions about actions to take.

Students engage in AaL as their draft contributions to a Wikipedia article near completion, as a classmate provides detailed feedback on their work. In addition, students in another university course that are honing their peer assessment abilities also review the article draft, and despite the fact that they are first-year students, they have provided feedback that has proved to be particularly helpful to the seniors.

A newly implemented method of AaL has added to potential learning in the course – students review their contributions using the assignment's assessment rubric, offering them an opportunity to make decisions about potential changes prior to summative grading. Because they have made self-directed choices about what content was needed to enhance the existing article, they do not necessarily see strong connections between what they have accomplished compared to what another classmate might have done. This flexible rubric provides assurance and emphasises the flexible nature of the assignment based on each student's assessment of what is needed.

Final reflective essays indicate that students understand how the course components interconnect. One student's comments – for which ethical clearance as part of a bigger project and written informed consent for use was obtained – encapsulates themes found in this chapter:

> For the most part, I have only learned a fraction of what my major entails so I am not a true expert. I would say I am more of an acolyte, but even then, this

process has given me insight and the confidence to recognize that I know enough about a subject to at least start a Wiki page about it and generate interest from the larger community [...]. [*T*]he coordination between Metaliteracy and Wikipedia has encouraged constant reflection on each word that I write and whether or not what I am writing is what I think and if it is the best way of thinking, engaging the metacognitive faculties within the metaliteracy framework. (Undergraduate student, Philosophy major, 24 September 2020)

A six-week course provides challenges for integrating metaliteracy, IL and a mechanism for allowing students to put their newfound learning into practice, further developing it as they do. Whilst ideally there would be additional time to focus on SDL, the students do have the opportunity to continue with their 'journey of discovery' (Gibbons 2002:45).

■ Conclusion

This chapter sought to explore and make explicit the interconnections between metaliteracy and SDL. An additional goal of the authors was to identify the assessment methods most appropriate for determining one's progress towards metaliteracy and make connections between this assessment and the forms particularly pertinent in SDL, AaL and AfL.

The chapter started with an overview of metaliteracy and its core components, followed by a section that considered SDL as viewed through the lens of metaliteracy. It then delved into a close examination of selected components from metaliteracy, relating them to SDL and assessment. Two descriptive case studies close the chapter. This exploration on both the macro and the micro level provides solid evidence of the interrelationships amongst metaliteracy, SDL, AaL and AfL. The authors propose that future research studies into these topics expand their scope and their import by considering these connections.