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Beyond grades: developing knowledge sharing in learning communities as a graduate attribute

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ABSTRACT
The ability to share knowledge is an important attribute that students develop in learning communities (LCs), enabling them to succeed in their education and careers. Insufficient research addresses the development of such knowledge sharing in LCs though, including whether it aligns with students’ success (i.e., grades). To address this gap, the current study investigates various determinants of knowledge sharing and their effects on student success. Survey data from 183 psychology students measure altruism, trust, belongingness (community identification), perceived social interaction, and attitudes toward and expectations of the benefits of knowledge sharing. A path analysis shows that trust affects the expected personal and community benefits of knowledge sharing indirectly, through students’ general attitudes toward knowledge sharing. Altruism, trust, and belongingness affect the personal benefits of knowledge sharing indirectly through social interaction. No significant relation emerges with first-year study success. Knowledge sharing as added attribute does not appear aligned with study success measured by individual course grades.

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Introduction
Globalization, technology, competitiveness, and the importance of the knowledge economy require a well-skilled labour force (World Economic Forum, 2018). These trends in the labour market have impacted views on higher education responding to the needs of the global labour market (OECD, 2012). The supply of higher education graduates should contribute to the labour market’s demands (Harvey, 2000; Marginson & Van der Wende, 2007), but how can higher education institutions help students succeed? This question immediately gives rise to a second question: What makes a twenty-first century student successful?

Prior literature highlights various correlates of study success, measured as retention, grade point average, obtained credit points, or programme completion (Richardson,
Abraham, & Bond, 2012; Schneider & Preckel, 2017). Recently, Van der Zanden, Denessen, Cillessen, and Meijer (2018) operationalized study success as three dimensions: GPA (grade point average), critical thinking skills, and psychosocial development. Consistent with previous reviews (Richardson et al., 2012; Schneider & Preckel, 2017), they found GPA was predominantly related to student characteristics, whereas critical thinking skills were associated with the learning environment. Grades seem not only important for becoming successful as a graduate, but the acquisition of specific attributes by graduates has been emphasized, beyond disciplinary knowledge, as an important element of value for employability that can be achieved through the successful completion of a study programme (Barrie, 2004; Green, Hammer, & Star, 2009; Hughes & Barrie, 2010; Yorke, 2006). Universities increasingly recognize that students need to develop graduate attributes that will equip them for professional careers (Barrie, 2007).

Rather than being specific to any discipline, generic graduate attributes refer to the transferable knowledge, skills, and abilities that higher education students should develop during their studies which contribute to career competencies and professional development. The rich literature in the space of higher education and graduate employability points out a variety of graduate attributes. Which knowledge, skills and qualities are most important to develop as a preparation for future career and which are generic or disciplinary-dependent remains a topic of debate though (Barrie, 2012; Bridgstock & Cunningham, 2016; Hill, Walkington, & France, 2016; Jones, 2013). In the guidelines for Graduate Attributes of the Four-Year Australian Undergraduate Psychology Program (2008), besides knowledge acquisition, the key goals are understanding and application of psychology, research methods, critical thinking skills, and communication skills (Cranney et al., 2009). According to Osmani, Weerakkody, and Hindi (2017), communication skills, teamwork, research skills, problem solving, creativity, critical thinking, and time management are the most valued graduate attributes, because of their potential importance in workplaces. Also Wellman (2010) finds that employees value transferable communication and relationship-building skills, as well as pertinent personal traits (e.g., team player, having ideas). Holmes (2013) exemplifies graduate attributes and skills in higher education curricula and research in nine institutions in the UK indicating that communication and teamwork are commonly represented.

Communication and teamwork relate inevitably to social interactions and knowledge sharing. For organizations, different types of knowledge shared among employees can facilitate knowledge creation and innovations (Filieri & Alguezau, 2014). Advances in information technology and competition among organizations increase the importance of knowledge sharing and knowledge management even more (Owen-Smith & Powell, 2004; Shu, Page, Gao, & Jiang, 2012). Thus, in addition to their discipline-specific content knowledge, graduates need to be able to use their knowledge to solve problems, acquire new knowledge and skills (life-long learning), think critically, communicate and work with others with similar or distinct knowledge, and share their knowledge with team members (teamwork). Being able to interact, collaborate, and share knowledge in a team thus is valuable in every discipline.

To ensure that students develop the generic graduate attributes of interpersonal skills, teamwork, communication, interaction, and knowledge sharing (Harvey, 2000; Osmani et al., 2017; Wellman, 2010), many degree programmes embed small group learning into their curricula. Small group learning enables students to interact and
thereby learn how to work and communicate in teams and share knowledge for both personal and group benefits. A well-known example is the introduction of learning communities (LCs); broadly defined, LCs are small groups, formed intentionally out of a cohort of students, that usually include 10–15 students and are guided by a mentor, such that the members get to know one another and feel as if they belong together (Brouwer, 2017; Tinto, 2000). These students actively construct knowledge together, mostly by collaborating on assignments (Tinto, 2000; Zhao & Kuh, 2004). Important characteristics of learning communities are shared knowing, sharing knowledge and shared responsibility (Tinto, 2000), which implies that a positive attitude to sharing knowledge is a prerequisite.

Despite the potential importance of knowledge sharing as a graduate attribute in curriculum-based LCs, little is known about the contributing factors of students’ knowledge sharing in small groups. Most prior research into knowledge sharing focuses on organizational contexts (Majid & Wey, 2009) or, if it addresses educational contexts, relies on virtual communities (Chen & Hung, 2010; Liou, Chih, Hsu, & Huang, 2016). To expand this research stream, the current study surveys actual undergraduate psychology students, then applies a path model of the determinants that might contribute to the students’ perceptions of the benefits of sharing knowledge for themselves or their learning community. These tested determinants include individual characteristics that likely contribute to social interactions and knowledge sharing (altruism, attitudes toward knowledge sharing), as well as forms of social capital (trust, social interaction). Finally, this study tests whether sharing knowledge according to personal or community outcome expectations relates to study success (i.e., weighted average marks).

Knowledge sharing

Personal and community outcome expectations in LCs

Knowledge sharing is a bi-directional process, in which group or team members exchange, modify, and re-use ideas and information, based on mutual trust (Chen & Hung, 2010; Garcia-Sánchez, Diaz-Diaz, & De Saá-Pérez, 2017). Trust creates and helps maintain exchange relationships, which may encourage knowledge sharing (Alstyne, 2005; Droege & Hoobler, 2003; Hsu & Lin, 2008). In contrast with an altruistic view, which suggests that people share knowledge to help others without expecting any reward, social exchange theory takes a more egocentric perspective, such that people invest in others only when they can expect a valuable return in the future or else seek to return value for resources received in the past (Blau, 1964; Cook & Rise, 2003; Homans, 1961). Whether a relationship persists then depends on the credit or payoff balance (Katz, Lazer, Arrow, & Contractor, 2004): People continue to support others because positive value accrues from the relationship situation.

Prior literature also distinguishes proactive helping from reactive helping (Spitzmüller & Van Dyne, 2013). Proactive helping benefits the individual self, such as one’s reputation or positive self-evaluation. This intrinsic motivation meets personal needs. Reactive helping instead benefits others and results from a sense of compassion for others in the group or in response to prior positive experiences with team members or the organization. Knowledge also might be shared for self-interested or other-interested motives.
In an educational context, students similarly engage in knowledge sharing for different reasons, namely, due to personal or community-based motivations. Knowledge sharing sparked by personal outcome expectations suggests that the student believes that sharing his or her knowledge will result in personal benefits, such as an enhanced reputation. Knowledge sharing due to learning community outcome expectations instead implies a belief that when the student shares knowledge, it will help the community, such as increasing group knowledge (Chiu, Hsu, & Wang, 2006).

**Determinants of knowledge sharing**

People share their knowledge when doing so feels meaningful and beneficial, and these perceptions arise for different reasons (Majid & Wey, 2009). Personality, psychological, and contextual factors all could enhance or inhibit such behaviours. Prior research, conducted in business organization and virtual community settings, identifies several determinants that likely enhance intentions to share knowledge (Chang & Chuang, 2011; Chow & Chan, 2008; Wang & Hou, 2015). First, attitudes toward knowledge sharing refer to the extent to which a person has a general, positive attitude toward sharing knowledge. Although it likely relates to intentions to share knowledge (Chow & Chan, 2008), the precise link remains unclear, especially with regard to the different motives for sharing knowledge in LCs. Second, altruism is voluntary helping behaviour, without expecting a return (Chang & Chuang, 2011), which relates positively to the intention of knowledge sharing in online settings (Hsu & Lin, 2008). Therefore, as a personality factor, altruism should contribute to a positive general attitude toward sharing knowledge and interacting with others. Third, when people interact in a group, they identify with it and perceive a role in that group, prompting perceived group membership and belonging (Hsu & Lin, 2008). This perception of belonging to the group in turn encourages them to interact more, giving them more opportunities to share their knowledge. Identification with a group thus seems important; students also are more willing to share knowledge with group members than with non-group members (Majid & Wey, 2009).

**Social capital in LCs**

The learning community structure establishes an interactive, collaborative environment that helps students’ transition to the university setting, by encouraging social interaction and building social capital (Brouwer, Jansen, Flache, & Hofman, 2016). Social capital can be defined as a person’s access to and use of valuable resources (e.g., information, knowledge), obtained through social relations or networks, based on trust, social norms, and values that help him or her attain personal goals (Coleman, 1990; Lin, 1999; Putnam, 1995). For students, social capital implies they can attain personal goals that could not be achieved without such valuable resources (cf. Coleman, 1990), including study success and the attainment of graduate attributes that equip students to deal with the demands of the job market after their graduation.

Mutual social trust is a crucial form of social capital that facilitates social interaction and also functions as a prerequisite for a willingness to share study-related information and knowledge, such that it also influences study success (Coleman, 1990; Putnam, 1995). Trust has been defined loosely (Cook, 2005) and has been studied from different
perspectives, and conceptualized variously as a personality trait, social structure, belief, or behaviour (McKnight & Chervany, 2001). Trust literally indicates a firm belief in the reliability, truth, or ability of someone or something (definition derived from the Oxford Dictionary). In risky or unknown situations, it comes into play, unlike in familiar situations with low risks (Cook, 2005). For first-year students, the university context is unfamiliar, and they must develop trustworthy relationships over time. Without trust, small groups can create feelings of unease and an unwillingness to share information, opinions, or ideas (Chang, Diaz, & Hung, 2015). Yet research about the impact of trust on knowledge sharing is inconclusive. Chang and Chuang (2011) find a positive link between social trust and the quality of knowledge sharing, but Chow and Chan (2008) do not uncover any significant effect of social trust on attitudes toward knowledge sharing, though attitudes toward knowledge sharing contribute to intentions to share knowledge. Previous learning community research has not explicitly linked trust to personal or community outcome expectations of knowledge sharing.

In addition, the information potential inherent to social relations constitutes an important form of social capital. Relationships and interactions with fellow students provide social capital that facilitates knowledge and informational exchanges among peers (Coleman, 1990). University students must share knowledge, because only by sharing knowledge can they extend their individual and collective group social capital (Oh, Labianca, & Chung, 2006). As higher education research has shown, working in small groups and knowledge sharing constitute important elements of the learning process that may improve performance (Laal & Ghodsi, 2012). Tinto’s (1997) interactionalistic model emphasises the added value of social interactions, whether study- or non–study-related interaction, among fellow students for study success. Unlike lecture-centred approaches that focus on instruction, in LCs, the focus is on social interactions, collaboration, and knowledge sharing (Majid & Wey, 2009). As previously mentioned, according to Tinto (2000), knowledge sharing is a central facet of LCs: When students mutually exchange study-related information, ideas, and expertise (Garcia-Sánchez et al., 2017), it can contribute to the competence of individual students or the learning community as a whole.

**Study overview**

Learning communities exist to achieve various positive outcomes related to graduate attributes, including collaboration, engagement, and, ultimately, study success (Butler & Dawkins, 2008; Zhao & Kuh, 2004), all of which may demand knowledge sharing. Because knowledge sharing is one of the important aspects of learning communities, this is the central theme in our study. To our best knowledge, most studies of knowledge sharing consider organizational or virtual contexts (Chiu et al., 2006; Lin, Hung, & Chen, 2009; Usoro, Sharratt, Tsui, & Shekhar, 2007), with little research focused on the determinants of knowledge sharing among university students participating in LCs. To enhance knowledge sharing in such settings, it is critical to determine why students share their knowledge (Chen & Hung, 2010). A contrast of the different motives for sharing knowledge provides a nuanced view that can shed new light on this important question. The criticality of social interaction and a view of knowledge sharing as a developing graduate attribute within LCs, with possible effects on student success, guide these research questions. Formally:
(1) To what extent do altruism, trust, and belongingness (identification with the learning community) contribute to social interaction and general attitudes toward sharing knowledge, and how do general attitudes and social interaction relate to personal outcome and community outcome expectations of knowledge sharing?

(2) To what extent does knowledge sharing with personal and community outcome expectations relate to study success in LCs?

By leveraging previous literature, the conceptual model for the present research in turn predicts the following relations:

(1) Altruism, trust, and belongingness, through the general attitude toward knowledge sharing, relate indirectly to knowledge sharing for personal outcome expectations and community outcome expectations.

(2) Altruism, trust, and belongingness, through social interactions, relate indirectly to knowledge sharing for personal outcome expectations and community outcome expectations.

(3) Knowledge sharing for personal outcome expectations and community outcome expectations contributes directly to study success.

Methods

Participants and procedure

At a Dutch, research-intensive university, first-year psychology students were assigned to a learning community at the start of the first semester and received invitations to participate in an online survey, maintained by the online research management SONA-system, which allows students to obtain research participation credits. Students sign up voluntarily through the SONA-system and receive credits automatically after their participation. In the introduction to the survey, students learned about the research goals and the study procedure. The study also was approved by the university’s ethical committee, and the students provided informed consent to participate and have their results released more widely. The online survey data were collected at the end of their first semester (November 2015–January 2016). Surveys were provided in English, and the amount of time needed to complete the survey was about 15 minutes. Initially 260 students enrolled for the study, but 77 (29.6%) were excluded because they did not provide their ID-number for releasing their study results, did not respond to any question or did not give serious answers (e.g., same scores for all items). Thus the sample of 183 student participants included 152 (83%) women, 31 (17%) men, with mean ages between 19 and 20 years. The response rate was 34% (183 of 534 psychology students in total).

Measurements

In addition to gathering background characteristics, such as gender, age, and nationality, the measurement items, derived from previously validated measures, either validated in the higher education context or organizational contexts. The items validated in the organizational context were adapted to the (Dutch) higher education context and LCs. Students
responded on 5-point Likert scales (1 = ‘strongly disagree’ to 5 = ‘strongly agree’). Table 1 contains the scale items, means (M), standard deviations (SD), and reliability (α). The Cronbach’s alpha coefficients indicated good internal consistency for the scales, ranging from .75 to .89.

**Altruism**
The measure for altruism was derived from compassion and solidarity scales, as applied in organizational contexts (Boom & Pennink, 2012). Altruism referred to the extent to which students were willing to help other students. An example item read, ‘I am willing to listen to my fellow students if they have problems’.

**Trust**
Trust was measured with seven items, assessing the extent to which members of the learning community could rely on one another for support. These items came from studies of organizational contexts (Chow & Chan, 2008) and were adapted to the educational context. An example item was, ‘Fellow students will help me whenever needed’.

**Belongingness**
For belongingness, the measure reflected the extent to which students identify with the group, using items such as, ‘I feel a sense of belonging towards my group of fellow students’. Together, the items reveal the sense of belongingness, positive feeling toward the learning community, and group cohesion. This scale came from a measure applied in a virtual learning community context, modified to fit offline, curriculum-based LCs (Chiu et al., 2006).

**General attitude toward knowledge sharing**
The attitude toward knowledge sharing measure refers to favourable or positive feelings about knowledge sharing in general (Chiu et al., 2006; Chow & Chan, 2008). An example item was, ‘Sharing knowledge with fellow students is always good’.

| Table 1. Descriptive statistics, reliabilities, and bivariate correlations. |
|-----------------------------------------|------------------|-------------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                                        | Mean | SD  | α (n items) | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   |
| 1. Altruism                            | 4.08 | 0.49| .83 (5)     | 1.00|     |     |     |     |     |     |     |     |
| 2. Trust                               | 3.84 | 0.50| .81 (7)     | .44**| 1.00|     |     |     |     |     |     |     |
| 3. Belongingness/identification        | 3.77 | 0.73| .89 (4)     | .37**| .70**| 1.00|     |     |     |     |     |     |
| 4. General attitude knowledge sharing  | 3.86 | 0.61| .80 (4)     | .30**| .48**| .41**| 1.00|     |     |     |     |     |
| 5. Social interaction                  | 3.93 | 0.48| .78 (7)     | .55**| .74**| .73**| .37**| 1.00|     |     |     |     |
| 6. Knowledge sharing POE               | 3.79 | 0.48| .83 (6)     | .24**| .33**| .27**| .44**| .31**| 1.00|     |     |     |
| 7. Knowledge sharing COE               | 3.79 | 0.55| .75 (3)     | .26**| .29**| .22* | .41**| .21* | .61**| 1.00|     |     |
| 8. Study success year 1                | 6.25 | 1.13| –.09        | –.03| –.12| –.01| –.06| –.03| –.01| 1.00|     |     |

Note: POE = personal outcome expectations; COE = community outcome expectations. N = 183.

**p ≤ .001; *p ≤ .05.**
Social interaction
The measure of social interaction reflects perceived interactions of students with their fellow students, pertaining to non-study-related interactions (outside the LCs), discussion about study-related topics and collaboration (Severiens, Ten Dam, & Blom, 2006). An example item was, ’I work well with my fellow students’.

Knowledge sharing expectations
Knowledge sharing might result from the willingness to behave this way, in an effort to achieve individual purposes or personal outcome expectations, such as an enhanced personal reputation or more friendships (Chiu et al., 2006; Chow & Chan, 2008). Thus the survey included, for example, ‘Sharing my knowledge will help me to make friends with fellow students’. It also could stem from a willingness to share in an effort to achieve group purposes, or community outcome expectations, such as better group functioning (Chiu et al., 2006; Chow & Chan, 2008). For example, the survey included, ’Sharing my knowledge will help my group of fellow students accumulate or enrich knowledge’.

Academic goals (study success)
Study success provides an indicator of the extent to which students achieve their academic goals, measured as the weighted average mark. That is, the students’ grades have been weighted by their obtained credit points (European credits), divided by the maximum credit points that they could have obtained during their first year (60 credits).

Statistical analysis
The proportion of missing cases was 12% on study success (N = 183). The Little’s MCAR (missing completely at random) test resulted in a significant chi-square, indicating that the data were not missing completely at random (χ²(7) = 15.59, p < .05). Thus, the variables appear MAR (missing at random), because they relate to the observed data (e.g., De Leeuw, Hox, & Huisman, 2003; Little & Rubin, 1987). In turn, the missing values were replaced using SPSS version 23, which imputed the missing data five times.

The conceptual model – with the hypothesized relationships of the antecedents of knowledge sharing, social interaction, knowledge sharing for personal and community outcome expectations, and study success – was tested by path analysis in Mplus Version 7.2. Maximum likelihood estimation with robust standard errors estimation (MLR) applied to handle the MAR. The overall goodness of fit of the tested model was derived from several indices: the ratio between the chi-square and degrees of freedom (χ²/df), comparative fit index (CFI), root mean square error of approximation (RMSEA), standardized root mean square (SRMR), and Tucker–Lewis index (TLI). Indications of a good fit require a nonsignificant χ²/df ratio, RMSEA values less than .06, SRMR at .08 or below, and CFI and TLI close to or greater than .95 (Hu & Bentler, 1999; Kline, 2011). The indirect effects instead rely on bias-corrected bootstrapped confidence intervals (Shrout & Bolger, 2002). Students were nested in LCs, so this study controlled for dependency among members of the same community, using the complex option to adjust the standard errors (as in the MLR estimation too).
Results

Correlation analysis

The bivariate correlation analysis explores the relationships across the predicted determinants of knowledge sharing (altruism, trust, belongingness, social interaction, general attitudes toward knowledge sharing) and sharing knowledge with different outcome expectations, as well as with study success. The correlation analysis shows mainly positive and significant relationships, though none of the variables relate significantly to study success. Trust is highly correlated with social interaction (\(r = .74, p \leq .001\)). Sharing knowledge due to personal outcome expectations and due to community outcome expectations correlate relatively strongly and positively (\(r = .61, p \leq .001\)). Table 1 provides more details.

Path analysis

The path model in the conceptual model (Figure 1) fit the data well: \(\chi^2(12) = 12.832; p = .38, CFI = .998, TLI = .995, RMSEA = .020; 90\%\) confidence interval [.000; .082], and SRMR = .033, as further detailed in Figure 2. Sharing knowledge for different reasons, whether personal or community oriented, does not contribute to study success directly or indirectly, but a positive general attitude toward sharing knowledge contributes to sharing knowledge for personal and community benefits. Trust appears important for developing a positive general attitude about knowledge sharing and social interactions with fellow students. Altruism and belongingness or identification with the community contribute positively to social interactions and thus to sharing knowledge for personal reasons. The relatively strong relationships of trust with general attitudes toward knowledge sharing and, to a lesser extent, social interactions indicate that trust among learning community members helps build social capital and develop knowledge-sharing attitudes, as a graduate attribute.

As expected, several indirect effects emerge from the data. First, altruism (\(b_{\text{indirect}}^* = .04 [.01; .09]\)), trust (\(b_{\text{indirect}}^* = .05 [.02; .13]\)), belongingness (\(b_{\text{indirect}}^* = .07 [.02; .14]\)) relate indirectly to sharing knowledge for personal reasons, through social interaction. Second, trust and sharing knowledge for both personal reasons (\(b_{\text{indirect}}^* = .16 [.07; .27]\)) and community reasons (\(b_{\text{indirect}}^* = .16 [.06; .26]\)) relate indirectly through beneficial

Figure 1. Conceptual model.
general attitudes toward knowledge sharing. The model explains 67% of the variance in social interaction, 29% in general attitudes toward knowledge sharing, 25% in sharing knowledge for personal reasons, and 20% in sharing knowledge for community reasons. The standardized coefficients indicate that trust contributes most to general beneficial attitudes to sharing knowledge and thus to sharing knowledge due to personal and community outcome expectations.

**Discussion**

Nowadays, economies are driven by knowledge and creative ideas. Knowledge has a powerful influence, such that it can lead to the prosperity of not just countries but also industries, organizations, and institutions. In both organizational and economic senses, group members must be willing and able to share their knowledge with other group members (Pérez-Luño, Cabello Medina, Carmona Lavado, & Cuevas Rodríguez, 2011). Knowledge sharing as a graduate attribute in higher education in turn is an employability skill that can help students succeed in their future careers (Wei, Choy, Chew, & Yen, 2012). Most research on knowledge sharing in communities refers to virtual communities, such as online social networks (Chen & Hung, 2010; Liou et al., 2016), but it also is pertinent to make students aware of the importance of and motives for knowledge sharing in a learning environment that naturally encourages knowledge sharing, namely, curriculum-based LCs. In these LCs, students meet daily, get to know one another and can develop trusting relationships (Katz et al., 2004). As social capital, trust may facilitate social interactions and positive attitudes toward sharing knowledge, both of which are important for sharing knowledge to achieve personal and community outcomes (cf. Coleman, 1990; Putnam, 1995). The importance of trust as a prerequisite for social interaction and knowledge sharing is in line with Liou et al.’s (2016) identification of a mediating role of trust in virtual communities.

The current study, conducted among curriculum-based LCs, contributes to extant literature by shedding new light on the factors that affect expectations of knowledge sharing among first-year students in a real-world setting. The importance of trust, belongingness or group identification, and general attitudes toward knowledge sharing are confirmed in
curriculum-based LCs, going beyond the virtual environments described in prior research (e.g., Yao, Tsai, & Fang, 2015). In turn, universities should realize that knowledge sharing is not a spontaneous action that students undertake automatically. Students may struggle to share their knowledge, especially if they have not yet developed trustworthy relationships. They also might experience competition, due to an individual grading system, or be afraid to contribute to a discussion for fear of providing incorrect information (Ardichvili, Page, & Wentling, 2003; Majid & Wey, 2009). Furthermore, this research reveals that expectations of the benefits of knowledge sharing are not related to first-year study success, measured as a weighted grade point average. The individual grading system thus appears poorly aligned with the community activities, even though the LCs are implemented explicitly to enhance student interactions, as a basic requirement for knowledge sharing. Students may not be aware of the potential benefits of sharing knowledge for themselves and the community, so they might refrain from this activity. In this real-world degree programme, knowledge sharing is not an explicit curriculum goal, so no explicit measure of this ability is included in exams. In a sense, knowledge sharing appears like an added value, beyond subject knowledge. Thus, the lack of relation between knowledge sharing and grades is not particularly surprising and consistent with the debate about the constructive alignment and the challenges of the assessment of graduate attributes (Hughes & Barrie, 2010).

This study emphasises the need to engage in constructive alignment, to integrate the development of graduate attributes into degree programmes (Treleaven & Voola, 2008). In this sense, universities could use the findings of this study as guidelines to increase knowledge sharing and learning in their LCs. First, they should find ways to increase trust among learning community members, because this determinant encourages knowledge sharing to achieve different, positive outcomes. To foster knowledge sharing, as a graduate attribute that needs to be developed, universities should require specific tasks that prompt students to experience interdependence and interactions in groups (Mastin & Yoon, 2013) and build trustworthy relationships among group members. Second, assessment is important for learning and therefore it is important that students are actively involved in the evaluation process (Boud & Falchikov, 2006). Written exams provide fewer opportunities to learn actively and develop such complex skills (Treleaven & Voola, 2008). According to Hughes and Barrie (2010), graduate attributes should not be assessed according to individual course grades; rather, students should be part of the assessment, which should align with the curriculum programme as a whole. Reflective journals, portfolios, peer and instructor feedback, individual and team-based assignments in which attributes as teamwork, knowledge sharing and communication are explicitly addressed, provide opportunities to develop and assess graduate attributes, such as sharing knowledge, collaboration, and critical thinking.

**Limitations and research directions**

A strength of this study is that it investigates the perceptions of students regarding the expected benefits of knowledge sharing in real-world LCs; however, these students are voluntary participants, from one degree programme in one university. Replications in other programmes and institutions could offer a more comprehensive picture of the
value of knowledge sharing for different motives and the potentially distinct determinants in different educational settings.

This study gives educators, teachers, and other practitioners who design LCs some insights, including the need to foster altruism or pro-social behaviour, trustworthy relationships, group identification, beneficial attitudes toward knowledge sharing, and social interactions, to enhance knowledge sharing that can benefit both individuals and the community. Further research should seek additional insights and recommendations for how LCs should be designed to create social capital, including trust and knowledge sharing, to the benefit of the individual students and their learning community. The survey results offer a clearer understanding of the determinants of knowledge sharing with different outcome expectations at group and individual levels but not about with whom or what kind of knowledge people share in their interactions with fellow students. Analysis of longitudinally collected student networks can provide insight in how students share their knowledge in their networks, depending on their structural positions, personal characteristics, and factors such as trust and social norms in the learning community (cf. Brouwer, Flache, Jansen, Hofman, & Steglich, 2018). Further research should investigate actual knowledge sharing, perhaps by using video observations in LCs. This could provide valuable insights about how students collaborate and share their knowledge (Leech & Onwuegbuzie, 2007), including with whom each student shares knowledge and what kind of information they share.

Conclusion

This article addresses an ongoing debate about whether student success involves more than good grades and also relates to the acquisition of graduate attributes that are necessary in career contexts. One graduate attribute, namely sharing knowledge with different outcome expectations, is the focus of the current research, which relies on social capital theory (Coleman, 1990; Lin, 1999; Putnam, 1995), Tinto’s (2000) interactionalist approach, and social exchange theory (Blau, 1964; Cook & Rise, 2003; Homans, 1961). A path model shows that an expectation that sharing knowledge will be beneficial, personally for the student and for the community, depends on the student’s general attitudes toward knowledge sharing and social interaction within the learning community. Trust contributes to a general attitude toward knowledge sharing and thus to knowledge sharing with expected personal and community outcomes, in partial support of the study predictions. Altruism, trust, and identification with the learning community (belongingness) contribute to social interaction and thus to knowledge sharing with expected personal outcomes. Trust in particular is an important incentive to encourage knowledge sharing with both personal and community outcome expectations. Yet another prediction from the model was not supported; study success, measured as the weighted grade point average after one year, was not significantly affected by expectations about the benefits of knowledge sharing. Student grades thus do not appear to align with a curriculum design that relies on LCs that encourage knowledge sharing development as a graduate attribute. Because assessments should better align with the curriculum goals, it seems useful to engage students to reflect on their own learning processes, as they relate to the graduate attribute of knowledge sharing and interactions in LCs.
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