

GRADE 10 SOUTH AFRICAN LEARNERS' EXPERIENCES DURING FACE-TO-FACE AND ONLINE LEARNING – IMPLICATIONS FOR SOCIAL INTERACTION

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Abstract

Learning in South Africa is characterised by unequal access and a diversity of cultures and languages within a single classroom, which influences social interaction. As technology becomes more sophisticated and readily available in classrooms, the question arises of whether digital tools influence social interaction to support learning. With Social Learning Theory being the primary lens, this study explored how South African grade 10 learners experience social interaction in face-to-face and online classrooms. In the context of multilingual, ongoing inequalities in resources and infrastructure, the study examined how modelling, feedback, and reinforcement differ across the two modalities. Learners from six schools were asked to complete a survey measuring teacher-learner interaction, peer interaction, classroom environment, technology-mediated interaction, and perceived social interaction in learning. Learners generally reported positive views across the variables above ($M = 3.28\text{--}3.74$). Face-to-face learners reported stronger peer interactions and teacher-learner relationships, as well as a more positive classroom environment, than those in online learning. Correlations showed a strong association between the classroom environment and both peer interaction ($r = .61$) and teacher-learner interaction ($r = .51$), whereas technology-mediated interaction was split into two factors. The logistic regression classified 84.4% of learners and identified peer interaction ($B = -2.07$, $p = .002$), age of the learner ($B = -1.66$, $p = .27$), home language ($B = -0.96$, $p = .004$) and repeated grades ($B = -3.06$, $p = .006$) as significant predictors of modality. This study makes a unique contribution by providing context-specific empirical evidence on how modelling, observation and reinforcement are supported in South African secondary schools. The study also highlights the vulnerability of peer interaction in online schools, the importance of the affective classroom environment for meaningful interaction, and the need for intentional design to recreate social interaction contexts in online classrooms. This study offers insights for curriculum planners, teachers and school leaders who plan to integrate technology meaningfully while maintaining the relational foundations of effective learning.

Keywords: *Social interaction, classroom atmosphere, teaching and learning relationships, secondary schools, technological tools.*

1. Introduction

Learning can be seen as a social process that involves shared meaning-making and interaction to construct knowledge (Vygotsky, 1978; Lave & Wenger, 1991). Hence, the quality of classroom interactions is important for learners' conceptual development (Hennessy et al, 2023). The participants in this study were grade 10 learners, in the adolescent developmental stage, which relies strongly on supportive relationships; the feeling of belonging must be considered to explain learners' motivation to participate in classroom activities (Wang & Eccles, 2012).

South African schools experience persistent inequalities in resources, infrastructure, and general learning conditions (Spaull, 2013). National policy in South Africa has promoted the use of ICT in line with the White Paper on E-education (2004) (Department of Education, 2004). However, implementation remains uneven, and technology-mediated learning is also disrupted by electricity instability (Mthanti, 2023).

The quantitative study was conducted in six schools, three face-to-face and three online, using a questionnaire completed by learners to measure perceptions of social interaction for teaching and learning. This study further highlights the central role of the classroom environment and the vulnerability of peer interaction in online learning environments.

The aims of the study were to describe the experiences of grade 10 South African learners of social interaction in face-to-face and online classrooms. And to examine how, within each modality, peer interaction, teacher-learner interaction, classroom environment, and technology-mediated interaction relate to one another and what the implications are for teaching and learning.

2. Literature review and theoretical framework

This study used Social Learning Theory as the primary lens, as it states that learning occurs through observation, imitation, modelling, and reinforcement in a social context (Bandura, 1977). Bandura (1977) further stated that new behaviours and ways of thinking can be observed in others (through modelling) and imitated. He further describes four processes which predict whether observational learning will result in performance, these include: attention (individual notices), retention (individual remembers what was observed), reproduction (individual enacts the behaviour), and lastly motivation (incentive to perform, including vicarious reinforcement) (Bandura, 1977). Clear modelling and observations, such as the teacher explaining work, peers working together, demonstrations and learning in an environment where feedback is visible, strengthen learning (Bandura, 1977; Roorda et al., 2011).

This study is concerned with social interaction and will draw on Moore's interaction framework, which distinguishes between learner-teacher, learner-learner, and learner-content interactions (Moore, 1989). These categories assist us in identifying where modelling and reinforcement opportunities occur in the classroom, e.g., teacher feedback, peer discussions, and in specifying how technology can enable or extend these interactions (Moore, 1989). To clarify the required conditions for meaningful participation in face-to-face and online classrooms, the idea of a community of inquiry can also be incorporated. The Community of Inquiry states that learning is a shared process that occurs when teaching, guidance, social presence, and cognitive presence work together in a learning environment (Garrison et al., 2000; Garrison, 2015).

Taken together, using Social Learning Theory as the primary lens, this study conceptualises social interaction as a classroom condition that creates (or restricts) opportunities for feedback, modelling and reinforcement (Bandura, 1977). Moore's interaction types and community inquiry clarify how these opportunities may differ across face-to-face and online teaching modalities (Garrison et al., 2000; Moore, 1989).

Teacher-learner interaction states that the teacher is the primary model who demonstrates, explains, and provides feedback to support learners' attention, retention, reproduction and motivation to participate in learning (Bandura, 1977). Evidence suggests that the affective teacher-learner relationship is associated with engagement and achievement, and supporting this relationship is central to learning (Roorda et al., 2011).

Peer interaction provides opportunities for vicarious learning by observing others and receiving social feedback. Peer interaction can provide modelling and vicarious reinforcement, thereby increasing learners' motivation to attempt and persist with tasks (Bandura, 1977). Peer interaction further strengthens learners' motivation to engage when they feel valued and respected (Furrer & Skinner, 2003).

Technology-mediated interaction is treated as either an enabling or a constraining condition for both modalities. Moore (1989) states that technology can amplify learner-teacher and learner-learner interactions through communication tools and can also influence learner-content interactions through resource design. Online communication is supported by synchronous and asynchronous lessons, chat functions, check-in classes, emails, feedback, and more, fostering a community where learners feel safe and motivated to interact.

The way tasks are designed influences interaction, since collaboration can be strengthened when the learning environment is designed to encourage interaction, and over-structuring hinders authenticity and limits interaction (Dillenbourg, 2002; Kirschner et al., 2004). Social interaction in South African classrooms is influenced by historical and structural inequalities, including persistent resource gaps (Chisholm, 2012; Spaull, 2013). The South African constitution further promotes mother-tongue basic education, which can be challenging when the language of teaching and learning differs from learners' home language, as language shapes participation and comprehension (Department of Basic Education, 2013).

3. Methods and data analysis

This quantitative research employed deductive reasoning, which proceeds from theory to hypothesis to structured, measured findings (Creswell, 2014). The qualitative approaches emphasise measuring variables as numeric data and using statistical procedures to examine patterns and relationships among variables (Creswell, 2005, 2014; Creswell & Creswell, 2023). In this study, the key variables were

social interaction and evidence of optimal teaching and learning, and the aim was to test their relationship using quantitative logic (Creswell, 2005, 2014). This study adopted a survey design to examine whether social interaction is associated with optimal teaching and learning across the modalities of online and face-to-face instruction, which is consistent with correlational quantitative designs (Creswell & Creswell, 2018). Survey research is appropriate for describing attitudes and perceptions and for efficiently testing associations between variables within a target population (Creswell & Creswell, 2018).

The sample comprised Grade 10 mathematics learners from three face-to-face and three online schools. Schools were selected based on accessibility and willingness to participate in the study. Online learners were distributed across South Africa, while the face-to-face learners were based in Gauteng. Online schools' instruction was in English, while face-to-face schools offered instruction in a mix of Afrikaans and English. Learners were asked to complete a questionnaire using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). The questionnaires were completed anonymously to protect learners' and schools' identities.

The data from the completed questionnaires were analysed with the support of the Statcon unit at the University of Johannesburg. Before the data was analysed, the learner responses were checked for any missing values or outliers. Once this was done, an exploratory factor analysis was conducted to evaluate the questionnaire and determine whether there are clusters of related items, as was observed with technology interaction (Tabachnick & Fidell, 2013; Hair, Black, Babin, & Anderson, 2019). Thereafter, the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity were used to determine the suitability of the data for factor analysis (Shrestha, 2021; Hair et al., 2019). Factors with eigenvalues greater than one were retained (Kaiser, 1958; Shrestha, 2021), and where multiple factors were extracted, Varimax rotation was applied to improve interpretability (Shrestha, 2021).

Validity was ensured by measuring internal consistency and reliability of the data, calculating Cronbach's alpha (Cronbach, 1951; Tavakol & Dennick, 2011). While alpha is more commonly used, alternatives, e.g., omega, can also be used if they better match the measurement model (Hayes & Coutts, 2020).

4. Findings

The sample comprised 123 learners: 59 male (48%) and 62 female (50.4%), with 2 learners preferring not to disclose their gender. The learners were mostly aged 16-20 (84.6%), and 52.8% reported that English is their home language. The modality data were available for 122 learners, including 50 from face-to-face schools and 72 from online schools. Almost all learners reported having reliable internet access at home (98.4%).

The composite scale means for all factors were above the midpoint, which shows that learners generally held a moderate-to-positive perception of the factors. Normality testing indicated that the classroom environment did not deviate significantly from normality. However, the other composite scores showed departures from normality, as shown by the Kolmogorov-Smirnov and Shapiro-Wilk tests. Internal consistency reliability was moderate across most scales, with $\alpha=0.64-0.75$, except for the two-item technology factor, which had $\alpha=0.47$. Exploratory factor analyses support a largely unidimensional structure for most of its sets.

The correlation results indicated how the various variables of social interaction are related. There is a weak correlation between teacher-learner interaction and peer interaction, whereas there is a strong correlation between teacher-learner interaction and the classroom environment.

When analysing the logistic regression, peer interaction and learner background variables were the strongest predictors in the school mode. These findings suggest that social learning is not inherently tied to modality but rather depends on the extent to which peer interaction is supported and structured, particularly in online environments. The binary logistic regression can be seen below:

Table 1. Binary Logistic Predicting Schooling Modality (Online = 1, Face-to-face = 0).

Predictor	B (Regression coefficient)	Standard Error	Wald Chi-Square test	p	Odds Ratio (Exp(B))
Age group	- 1.660	0.749	4.915	0.027	0.190
Home language	- 0.961	0.331	8.457	0.004	0.382
Repeated grades	- 3.060	1.124	7.411	0.006	0.047
Peer interaction	- 2.063	0.673	9.407	0.002	0.127
Technology interaction F1	0.787	0.420	3.511	0.061	2.197

5. Discussion

The findings of the study are consistent with Social Learning Theory, as learners in face-to-face classrooms reported stronger peer interactions, richer teacher-learner relationships, and a more positive classroom environment than those in online learning environments. The face-to-face learning environment naturally allows for stronger social presence and collaboration, due to immediacy and proximity (Garrison, Anderson, & Archer, 2000). The strong positive association between the classroom environment and the other interaction scales emphasises the importance of an affective classroom environment that enables meaningful social learning. When learners perceive the classroom atmosphere as supportive and encouraging, they are more likely to engage in the learning process by participating, collaborating, and engaging with peers and the teacher (Wentzel, 2017).

Learners in online classrooms, however, relied strongly on technology-mediated interaction and reported generally low interaction with peers. This finding correlates with international findings that online learning environments struggle to replicate the immediacy and behavioural cues found in face-to-face settings (Borup, Graham, & Davies, 2013). The findings also indicated that not all technology-based communication supports social presence equally, as seen with the two-factor technology scale. Peer interaction was a significant predictor of schooling modality, with higher levels associated with face-to-face learning. This further reinforces the idea that peer relationships are quite vulnerable in online learning environments and must be intentionally designed for (Hrastinski, 2009).

The demographic predictors, such as age group, home language, and repeated grades, also provide insights into learners across the different modalities and into why interaction patterns differ. Learners with home languages different from the language of teaching and learning were more likely to be in face-to-face classrooms. This may suggest that these groups rely more on linguistic code-switching or scaffolding, which is more feasible in face-to-face settings. The findings further align with research showing that academically vulnerable and multilingual learners require and benefit from high-support, high-interaction environments (Schleicher, 2019). Together, the study's results show that the instructional modality influences opportunities for social interaction and the types of learners who access and benefit from them.

These findings offer several practical implications for teaching and learning. The classroom climate should be prioritised as it is crucial for social interaction. A conducive classroom climate where learners feel they belong can be achieved by creating clear norms for interaction, which include communicating warmly and responsively (Wentzel, 2017). As the data suggests, peer interaction is one dimension in the online environment that is most fragile. To manage this, online schools should focus on creating and integrating opportunities where learners can collaborate, such as breakout rooms, peer feedback cycles, discussion forums, or small-group projects. Research shows that guided peer interaction can increase social presence and reduce the feeling of isolation in online environments (Garrison et al., 2000; Hrastinski, 2009). Since different technologies serve different purposes, teachers should incorporate tools that support dialogue, copresence, and other shared activities, rather than focusing solely on content-delivery technologies. The disconnection in the online environment is also present in teacher presence. The teacher should also be present in the lesson by being visible, providing timely feedback, and using multimodal communication to interact with learners and improve online engagement.

6. Conclusion

The study showed that learners reported generally moderate-to-positive perceptions of interaction and learning conditions in both face-to-face and online learning environments. Classroom environment and peer interaction showed the most consistent positive associations with perceived social interaction and learning, which suggests that the classroom environment remains central to learners' learning experiences. Technology-mediated interaction was also separated into two dimensions, with only one aligning with social-learning variables. The findings suggest that learners' learning experiences depend more on the teacher and school structure than on the modality itself (face-to-face or online).

For South African schools, facing multilingual and cultural differences, the emphasis must be on practices and technologies that intentionally support peer interaction and vulnerable learners while recreating a conducive learning environment. Ultimately, enhancing social interaction across modalities is essential for fostering meaningful learning experiences and ensuring that learners can participate fully, regardless of the platform they use.

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