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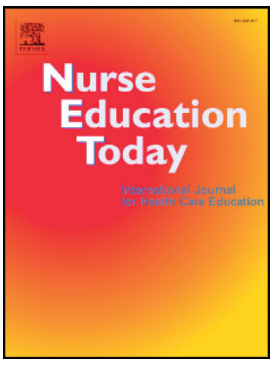

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WHAT ARE STUDENTS' NEEDS AND PREFERENCES FOR ACADEMIC FEEDBACK IN HIGHER EDUCATION? A SYSTEMATIC REVIEW.

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Abstract

Objective: Feedback is a fundamental factor within the learning process for students. However, it is widely known that students generally report that feedback is done sub-optimally in higher education. Therefore, this systematic review aims to identify students' needs and preferences for academic feedback in higher education.

Design, Data sources, review methods: A systematic review was conducted according to the PRISMA Statement Guidelines. Electronic databases were searched using a range of keywords and the findings were integrated in a narrative synthesis. Quality appraisal was undertaken.

Results: 5884 articles were retrieved, and 36 papers included. Three themes emerged across a wide range of academic disciplines which included: 1) preferences for feedback, 2) multimodality feedback and 3) emotional impact. Overall, quality feedback was related to the timeliness of feedback; balance between positive and constructive comments; direct feedback on content; linguistic clarity and legibility; grade justification and feeding forward.

Conclusion: This review has informed several important implications for practice uniquely from the students' perspectives. Educators are encouraged to implement the evidence-based preferences for student feedback in their daily practice. Students value multimodality feedback which is personalised to enable students to feed forward in their own individual learning journeys. Future research should explore whether demographic variables influence student feedback needs over time. We would recommend that future studies need to employ a rigorous methodology to avoid the shortcomings in the studies already conducted in this area.

Introduction

Feedback is considered a fundamental factor within the learning process for students (Ghilay and Ghilay, 2015) and can be part of the scaffolding (Wood et al., 1976, Vygotsky, 1978) to help students develop. Internationally, Quality Assurance Agency for Higher Education distinguishes feedback as a measure of teaching quality (Quality Assurance Agency for Higher Education, 2018). Evidence underscores that effective feedback on students' performance from assessments can be a front-runner to improve learning outcomes (Çakir et al., 2016a, Johnson and Cooke, 2016). In particular, for health care students feedback is considered essential for maintaining professional standards and patient safety (Hayes, 2018). Generally, effective feedback is associated with formative and summative assessments and is considered a cornerstone of sound pedagogy (Chokwe, 2015a).

Generally, formative feedback is providing students with feedback during learning activities to close the gap between what the student knows and does not know. Essentially, formative assessment and feedback is used by the teacher to help the students know how their learning is progressing and implement student-centred improvements (Biggs and Tang, 2011) which may also feed forward towards a summative assessment. Whereas, summative assessment is associated with grade outcome and corrective feedback to grade the students at the end of a module or unit in keeping with the intended learning outcomes, as part of constructive alignment (Biggs and Tang, 2011). Both forms of assessment and feedback are central to supporting and guiding students in their learning experiences.

However, it is widely known that students generally report in the National Student Survey (Office for Students, 2018) that feedback is done sub-optimally in higher education compared to other features of their studies. Moreover, there are several contextual factors that surround this area worthy of comment. Academic staff are continually facing new challenges due to

burgeoning student numbers and academic workload (Gregory and Lodge, 2015) and it is not uncommon for the various health disciplines to have class sizes in excess of 150 students. Additionally, several studies demonstrate a mismatch in students and teachers' perceptions of feedback (Perera et al., 2008, Kaivanpanah et al., 2015, Chokwe, 2015a, Dawson et al., 2018), which undoubtedly is one of the most significant issues that inhibit quality feedback and meeting student expectations. There is also missed opportunity for learning through feedback, as evidence identifies that some academics have limited skills, and knowledge, or they perceive summative assignments as a marking task, rather than a crucial and insightful opportunity to positively influence personalised learning (Orrell, 2006). Other issues are related to embedded perceptions that students don't read their feedback because students are only focused on their grade and ignore the written feedback provided to them (Iqbal et al., 2014, Gul et al., 2016).

The lack of effective implementation of assessment for learning (Parker and Winstone, 2016, Çakir et al., 2016a, Agnello et al., 2011, Budge, 2011, Carey et al., 2017) in higher education can be partly attributed to academics regarding this as a new practice over the past two decades (Clark, 2008). However, we contend that this is not a radical new approach to contemporary thinking in education, but rather it is embedded in the underpinning theoretical pedagogy of the early work of the Russian psychologist Lev S Vyygotsky (1896 – 1934) (Vygotsky, 1978). Assessment for learning can be informed by the theoretical principles of the proximal zone of development and scaffolding (Vygotsky, 1978), whereby the student can learn a certain amount on their own, and with the assistance and feedback they can develop their learning further.

To date, there has been a relative paucity of research which has focussed on the needs and preferences of feedback from the students perspective (Agius and Wilkinson, 2014, Carey et al., 2017). Generally, existing research is related to specific disciplines, such as nursing

(Duers and Brown, 2009, Ball et al., 2009, Race and Williams, 2018), computing (Cakiroglu et al., 2017), and food sciences (Siow, 2015), etc., which raises the question regarding the applicability of these findings across the higher educational sector as a whole. It is therefore timely in contemporary education to take stock of the evidence in relation to meeting the needs and preferences of students for feedback that crosses over educational disciplines. This approach may reveal commonalities in perspectives and needs of students, as well as illuminating important areas of divergence. Therefore, this systematic review of the literature aimed to address the following research question:

- What are the students' needs and preferences for feedback in higher education?

Method

The review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRIMSA) guidelines (Moher et al., 2015)

Search strategy

The following electronic databases (ERIC, MEDLINE and CINAHL) were searched from earliest date available to September 2018 to identify studies adopting a qualitative and/or quantitative methodology. We used a wide range of keywords and free text items to increase the inclusiveness and sensitivity of the searches (see **Table 1**). We searched for grey literature using Google Scholar and scrutinized the references lists of the included studies. Inclusion and exclusion criteria were applied to all records identified.

Inclusion Criteria

- Studies exploring student needs and preferences for feedback in higher education irrespective of academic discipline;
- Qualitative and quantitative methods irrespective of research design;

- Studies published in the English language;
- Studies conducted with adults (≥ 18 years old).

Exclusion Criteria

- Studies where needs and preferences were not explicitly reported.
- Studies where the level of education was not reported.

Study selection and data extraction

Following de-duplication, two review authors (CP and NP) independently screened the titles and abstracts of the identified records for eligibility based on the inclusion/exclusion criteria. The full-text of all potentially eligible records were retrieved and screened independently by the same review authors. Any disagreements were resolved through critical discussion. Both review authors (CP, NP) independently extracted the outcome data and compared for accuracy. Any disagreements were resolved by discussion or by consulting a third review author. A data extraction form was developed and piloted among the reviewers prior to its use. The extracted data included 'characteristics of included studies' (study design; countries and institutions where the data was collected; participant demographic characteristics, needs and preferences for feedback; the numbers of participants who were included in the study; losses and exclusions of participants, with reasons).

Evidence Synthesis

The review used a narrative synthesis and tabulation of primary research studies to generate broad findings and conclusions. More specifically, the narrative synthesis undertook the following steps: data reduction (sub-group classification based on levels of evidence and the review question), data comparison (iterative process of making comparisons and identifying relationships) and finally, conclusion and verification (Whittemore and Knafl, 2005). Such

an approach has been used in several integrative reviews (Paterson et al., 2018, Paterson and Nabi, 2017).

Quality Appraisal Methods

Methodological quality evaluation was conducted using three quality appraisal tools, a quantitative (Dixon-Woods, 2005), qualitative (Dixon-Woods, 2005) and mixed methods appraisal tool (Pluye et al., 2011) which enabled a plethora of methodologies to be evaluated.

Findings

Of the 5731 titles and abstracts reviewed, 67 full text papers were checked for eligibility and 31 articles were excluded with reasons (see **Figure 1**). This process left n=36 articles which fully meet the inclusion criteria: n=19 quantitative studies (Giles et al., 2014, Parkes and Fletcher, 2017, Edeiken-Cooperman and Berenato, 2014, Crews and Wilkinson, 2010, Budge, 2011, Weinstein and Wu, 2009, Race and Williams, 2018, Bourgault et al., 2013, Alamis, 2010, Douglas et al., 2016, Cakiroglu et al., 2017, Shellenbarger et al., 2018, Sulaiman et al., 2017, Mirriahi and Alonzo, 2018, Agnello et al., 2011, Carey et al., 2017, Chung, 2015, Siow, 2015, Atmaca, 2016), n=5 qualitative studies (Duers and Brown, 2009, Parker and Winstone, 2016, Dawson et al., 2018, Pokorny and Pickford, 2010, Poulos and Mahony, 2008) and n=12 mixed methods studies (Burns and Foo, 2014, Perera et al., 2008, Chokwe, 2015b, Mettiäinen, 2015, Weaver, 2006, Higgins et al., 2002, Hounsell et al., 2008, Lizzio and Wilson, 2008, Çakir et al., 2016b, Watkins et al., 2014, Bijami et al., 2016, Ball, 2010), (see **Table 2)**.

The studies had international representation from the following countries: Philippines (n=1), USA (n=7), Turkey (n=3), UK (n=10), Australia (n=7), Korea (n=1), South Africa (n=1), Tasmania (n=1), Sweden (n=1), Malaysia (n=3), and Iran (n=1). The sample sizes ranged

from n=10 to n=1409, with a total sample size of n=6,974, however several studies did not report their participant numbers (Parker and Winstone, 2016, Poulos and Mahony, 2008).

The participants across the studies represented a wide range of different disciplines in higher education that included: English, Accounting, Marketing, Management, Finance, Economics, General Business, Nursing, Fashion and Textiles, Computing, Biological Sciences, Social Sciences, Law, Engineering, Education, Health Sciences, Medicine, Food Science, Film, Theatre and Animation, Sports and Recreation, Music, Art and Design, Psychology, Mathematics, Criminology, and Dentistry. Noteworthy, there were three studies that did not specify the students' academic discipline (Burns and Foo, 2014, Dawson et al., 2018, Higgins et al., 2002).

Quality Appraisal

Across all the included studies there were a number for important limitations worthy of comment, (see **Table 3**) for quality appraisal. There were several studies that had a cross-sectional design and therefore, limits our understanding about how students' needs and preferences for feedback changes over the trajectory of their academic programmes (Alamis, 2010, Agnello et al., 2011, Atmaca, 2016, Ball et al., 2009, Budge, 2011, Carey et al., 2017, Chung, 2015, Chokwe, 2015b, Crews and Wilkinson, 2010, Douglas et al., 2016, Mirriahi and Alonzo, 2018, Race and Williams, 2018, Perera et al., 2008, Shellenbarger et al., 2018, Edeiken-Cooperman and Berenato, 2014, Dawson et al., 2018). For the most part, the included studies did not demonstrate reliability and validity in their questionnaire instruments used in each individual study context (Alamis, 2010, Agnello et al., 2011, Ball et al., 2009, Bourgault et al., 2013, Budge, 2011, Cakiroglu et al., 2017, Carey et al., 2017, Chung, 2015, Chokwe, 2015b, Moher et al., 2015, Crews and Wilkinson, 2010, Douglas et al., 2016, Mirriahi and Alonzo, 2018, Race and Williams, 2018, Parkes and Fletcher, 2017, Perera et

al., 2008, Siow, 2015, Edeiken-Cooperman and Berenato, 2014, Higgins et al., 2002). Few studies reported reliability of measures using the Cronbach's alpha which ranged from 0.745 (Atmaca, 2016) to 0.818 (Bijami et al., 2016).

Most studies also used convenience sampling (Alamis, 2010, Agnello et al., 2011, Atmaca, 2016, Ball et al., 2009, Bourgault et al., 2013, Budge, 2011, Cakiroglu et al., 2017, Chung, 2015, Crews and Wilkinson, 2010, Race and Williams, 2018, Perera et al., 2008, Siow, 2015, Burns and Foo, 2014) and the majority did not disclose the relationship between the researcher and the study participants (Alamis, 2010, Agnello et al., 2011, Atmaca, 2016, Ball et al., 2009, Budge, 2011, Cakiroglu et al., 2017, Chung, 2015, Crews and Wilkinson, 2010, Douglas et al., 2016, Race and Williams, 2018, Perera et al., 2008, Shellenbarger et al., 2018, Burns and Foo, 2014).

Moreover, the findings of studies have limited generalisability as the participants in individual studies were recruited from one higher education institution (Alamis, 2010, Agnello et al., 2011, Atmaca, 2016, Ball et al., 2009, Bourgault et al., 2013, Budge, 2011, Cakiroglu et al., 2017, Carey et al., 2017, Chung, 2015, Chokwe, 2015b, Crews and Wilkinson, 2010, Douglas et al., 2016, Mirriahi and Alonzo, 2018, Parkes and Fletcher, 2017, Perera et al., 2008, Siow, 2015, Edeiken-Cooperman and Berenato, 2014) with small sample sizes (Race and Williams, 2018, Siow, 2015, Burns and Foo, 2014). Finally, limited demographic details were reported in the following studies (Alamis, 2010, Agnello et al., 2011, Ball et al., 2009, Budge, 2011, Cakiroglu et al., 2017, Chokwe, 2015b, Douglas et al., 2016, Mirriahi and Alonzo, 2018, Perera et al., 2008, Siow, 2015, Edeiken-Cooperman and Berenato, 2014, Whittemore and Knafl, 2005) and therefore, the potential influence of demographic variables on preferences and needs remains unknown. Finally, there were also issues around a lack of transparency in the qualitative methods used in a range of studies and

no clear theoretical frameworks (Duers and Brown, 2009, Parker and Winstone, 2016, Douglas et al., 2016, Poulos and Mahony, 2008).

Themes

Several themes were identified across the included studies, (see **Table 4**)**,** which were related to 1) preferences, 2) psychological aspects and 3) multimodality feedback. There were several features that students identified as important in their preferences of quality feedback and this included: timeliness of feedback; balance between positive and negative feedback; direct feedback on content; linguistic clarity and legibility; grade justification and feed forward. Students reported that these components were needed across a range of academic disciplines.

Preferences

Students across the included studies reported problems with linguistic clarity and illegibility (Duers and Brown, 2009, Ball et al., 2009, Chokwe, 2015a, Lizzio and Wilson, 2008, Chokwe, 2015b) and problems with not receiving timely feedback (Pokorny and Pickford, 2010, Poulos and Mahony, 2008, Hounsell et al., 2008). It was identified by Higgins and colleagues (Higgins et al., 2002) study that 97% of students "read" the feedback that they were given, and 82% of students "used" the feedback to feed forward into future academic work. Thus, receiving quality feedback is important. Moreover, one study identified a statistically significant positive association between written feedback from the teacher and student performance, (r=.117, p=.015) (Bijami et al., 2016). Therefore, feedback is intrinsically linked to student outcomes and students perceive feedback in higher education as part of "the service" (Higgins et al., 2002).

Students reported a preference for receiving a balance of positive and constructive feedback in their work which was echoed in many studies (Alamis, 2010, Atmaca, 2016, Ball et al., 2009, Bourgault et al., 2013, Çakir et al., 2016a, Chokwe, 2015b, Dawson et al., 2018, Duers and Brown, 2009, Lizzio and Wilson, 2008). Importantly, students valued a composite of positive and constructive comments to improve future work and importantly students articulated that they were motivated to produce better quality work (Dawson et al., 2018) rather than just focusing on the negative aspects (Pokorny and Pickford, 2010). Across several studies, students expressed that they felt positive feedback was helpful as it made them feel good, enthused and gave them a sense of achievement. Although, it was not enough for academics just to write "good" or "excellent" (Douglas et al., 2016) as it does not offer any useful feedback to understand what they did specifically well. Students also identified that they did not get feedback when a high mark was awarded, suggesting the importance for feeding forward with grade justification (Weaver, 2006, Alamis, 2010, Budge, 2011, Perera et al., 2008) regardless of academic capability (Weaver, 2006).

Other facets of preferences for support included having direct content feedback on the topic area that focussed beyond simply pointing out grammatical and academic reference shortcomings (Chokwe, 2015b) to enhance and develop critical analysis skills (Lizzio and Wilson, 2008). Perera and colleagues (Perera et al.) pointed out in their study of 407 undergraduate medical students that 93% of the participants wanted specific comments to address areas for improvement. However, several studies (Bijami et al., 2016, Atmaca, 2016) identified that some students felt that always having directive feedback made students depend on their teachers too much and they believed that it encouraged them to become passive rather than active, independent and autonomous learners. Students articulated is was like being "*spoon-fed*" (Atmaca, 2016). One study (Perera et al., 2008) identified a significant correlation (using Pearson product-moment correlation coefficient) between

preferences for directive feedback and self-regulated learning skills (r=.145, p=.035). This suggests that for students with lower self-regulated learning skills they need and expect much more directive feedback than those with high self-regulated learning skills. Self-regulated learning skills might in part explain students' preferences for directive feedback. Students also found that commentary feedback which was conversational (Carey et al., 2017) was helpful as it was personalised to them and unique (Carey et al., 2017, Douglas et al., 2016, Edeiken-Cooperman and Berenato, 2014, Parkes and Fletcher, 2017). In contrast, one small study conducted in Turkey identified that students perceived personalised comments from lecturers as unhelpful and offensive (Atmaca, 2016). However, the nature of these personalised comments in this study (Atmaca, 2016) are unknown and may be open to different interpretations including that they might have been derogatory in nature.

Psychological aspects

Studies identified that feedback had an emotional impact (Alamis, 2010, Atmaca, 2016, Ball et al., 2009, Burns and Foo, 2014, Chokwe, 2015b, Crews and Wilkinson, 2010, Dawson et al., 2018, Edeiken-Cooperman and Berenato, 2014, Lizzio and Wilson, 2008, Parker and Winstone, 2016, Pokorny and Pickford, 2010, Shellenbarger et al., 2018, Weaver, 2006) on students in higher education, and students valued having their preference embedded as part of the assessment process. Students felt emotionally drained and deflated when they only received negative comments on their written work (Atmaca, 2016). Moreover, one study identified that students are not always able to cope with emotional aspects in the feedback process (Shellenbarger et al., 2018). Feedback can elicit a range of emotional responses which can affect confidence, motivation and students can even feel demoralised (Ball et al., 2009, Weaver, 2006). Some students identified that annotated feedback was written in a such a style that 43.7% of students felt demotivated, 36.3% felt that the tone of the feedback undermined confidence levels, and 49.2% of students perceived that the feedback only

focussed on the negative aspect of their work (Ball et al., 2009). One student articulated "*I was really sad after I got the feedback from my teacher*" (Burns and Foo, 2014). Students felt that because teachers only focused on the negative aspects they would prefer a "sandwich approach" to feedback (Chokwe, 2015b). Students felt that feedback should always provide encouragement that recognises effort, acknowledges achievements, considered criticism and gives students future hope (Lizzio and Wilson, 2008).

Students articulated that having their learning needs and preferences included in the assessment feedback process increased their levels of motivation (Cakiroglu et al., 2017, Çakir et al., 2016b, Crews and Wilkinson, 2010, Giles et al., 2014, Perera et al., 2008, Siow, 2015). One study identified that through their participation in the research being reported it was the first time that the student had been invited to share their learning needs and preferences around assessment and feedback; which was welcomed (Giles et al., 2014).

Multimodality Feedback

Students valued multimodality methods of feedback as they saw feedback as a two-way process (Budge, 2011, Race and Williams, 2018, Pokorny and Pickford, 2010) which included: face-to-face (Burns and Foo, 2014, Lizzio and Wilson, 2008, Budge, 2011), digital audio recorded feedback (Bourgault et al., 2013, Race and Williams, 2018, Parkes and Fletcher, 2017), written and electronic feedback (Mirriahi and Alonzo, 2018, Parker and Winstone, 2016, Mettiäinen, 2015) including digital mark-up tools such as GradeMark® (Watkins et al., 2014). Interestingly, just over half of the students 57% (n=92) preferred electronic feedback using GradeMark® compared to traditional written feedback, and 26% were not satisfied with the feedback provided to them using this digital tool (Watkins et al., 2014). Students' preferences for electronic feedback included: the ability to refer to their feedback later on in their programme of study, feedback provided in a concise and direct

style, and feedback which is documented clearly (Budge, 2011). Reasons against using electronic feedback included: lack of personalisation, limited narrative feedback, whereas, verbal feedback was more detailed to clarify points. Furthermore, students valued the opportunity to discuss their electronic feedback with their teachers in person (Perera et al., 2008) . One study identified that eight in ten students viewed verbal feedback was as important as written feedback (Carey et al., 2017), implying the need for a multimodality holistic approach (Carey et al., 2017, Crews and Wilkinson, 2010, Douglas et al., 2016, Dawson et al., 2018, Poulos and Mahony, 2008, Burns and Foo, 2014, Lizzio and Wilson, 2008, Agnello et al., 2011).

Discussion

We set out to identify the students' learning needs and preferences for feedback in higher education. Feedback is prerequisite to learning and should be used effectively to address complex issues that students grapple with as the cornerstone of sound pedagogy. We suggest that the provision of quality feedback should provide value for money for students who pay precious tuition fees to obtain their education (Higgins et al., 2002). We are the first group of educational researchers to distinguish the needs and preferences for students across many international countries and academic disciplines that has identified the core attributes of quality feedback that students need and want. This review adds an important contribution to the literature. The findings from this review underscores the educational preferences for quality feedback through the lens of students. The findings from this review will help to overcome the disparity in students and teachers' perceptions of feedback which is one of the main significant barriers to providing quality feedback (Perera et al., 2008, Kaivanpanah et al., 2015, Chokwe, 2015a, Dawson et al., 2018). This review has informed educators of student needs and preferences for feedback based upon empirical evidence.

Students valued multimodality feedback, including electronic feedback tools such as GradeMark® (Watkins et al., 2014) and digital audio recorded feedback (Crews and Wilkinson, 2010, Parkes and Fletcher, 2017, Race and Williams, 2018). However, irrespective to which mode of feedback was provided to students there was a need for the feedback to be personalised and unique to them. There is an international move towards the use of electronic platforms (e.g. Grade Mark®, Grade Link®) in higher education which can offer a potential solution through the provision of timely feedback (Duers and Brown, 2009, Pokorny and Pickford, 2010, Poulos and Mahony, 2008) which is accessible from any personal computer and less administratively burdensome on academic staff (Mettiäinen, 2015). However, to date the evidence has not demonstrated whether or not such electronic platforms actually enhances student learning (Watkins et al., 2014).

Future high quality research should explore "*how*" specifically students use their feedback (Pokorny and Pickford, 2010). Moreover, little is known about the student-to-student peer feedback and student-teacher relationships (Higgins et al., 2002) on learning. This review has importantly identified that educators must be mindful of the emotional impact and consequences that this can have on individual students. Across several studies the negative impact of feedback on emotional well-being was evident in student populations. Furthermore, data has demonstrated that the number of university students accessing counselling in some universities internationally has increased by 50% from 2010 to 2015 (Galante et al., 2018). The reason for this increase in accessing this service provision is unclear. Educators are required to be cognisant with the facets of quality feedback that students need, and value, as evidenced in this review.

This review has several important educational implications for practice. Firstly, educators across all academic disciplines should incorporate student preferences for feedback which includes the following: a balance between positive and negative feedback, direct feedback,

linguistic and legibility, providing feedback to help students to progress academically in future assignments, and feedback which is personalised to them. Secondly, receiving feedback can have psychological implications for students. Feedback can elicit powerful emotions in students which can affect confidence, motivation and students can also feel demoralised. Therefore, all educators are encouraged to be very mindful of their individual style and approach to providing feedback. Finally, students valued multimodal feedback which may include written, audio recorded or face-to-face.

Limitations

This review followed a transparent and rigorous review methodology, however there are several limitations worthy of comment. Due to the multiplicity of different questionnaire tools used in the context of each individual study it was not possible to perform a meta-analysis. Our review is limited to studies published in the English language, but we did include studies conducted across a wide range of international countries and student populations. The included studies in this review were methodologically poor; had small sample sizes; non-probability sampling; and presented with cross-sectional designs which limits their generalisability. However, several studies used qualitative and quantitative forms of data collections which identifies that this is an emerging evidence base.

Conclusion

This review has informed several important implications for practice uniquely from the students' perspectives. Educators are encouraged to implement the evidence-based preferences for student feedback in their daily practice. Students value multimodality feedback which is personalised, has a balance between positive and constructive comments, direct, timely, and clear, to enable students to feed forward in their own individual learning journeys. Future research should explore whether demographic variables play a moderation

or mediating role on student needs over time. We would recommend that future studies need to employ a rigorous methodology to avoid the shortcomings in the studies already conducted in this area.

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Figure 1. PRISMA

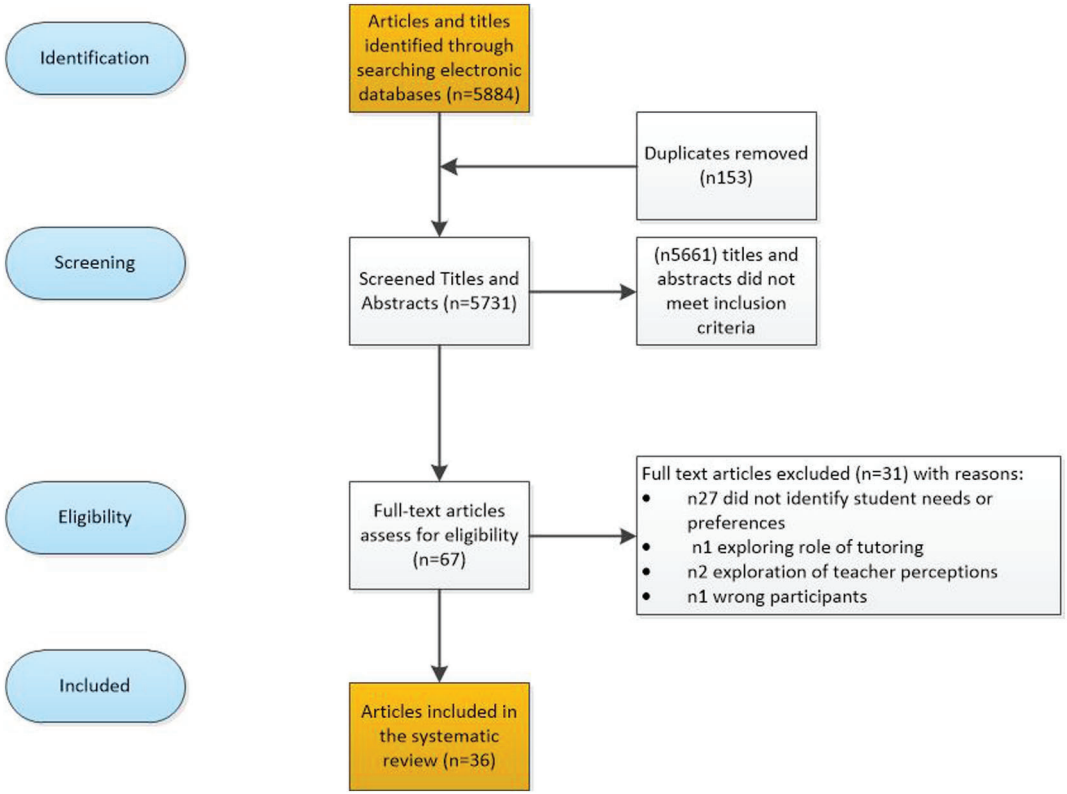
Identification
Screening
Eligibility
Included
Articles and titles identified through searching electronic databases (n=5884)
Duplicates removed (n153)
Screened Titles and Abstracts (n=5731)
(n5661) titles and abstracts did not meet inclusion criteria
Full-text articles assess for eligibility (n=67)
Full text articles excluded (n=31) with reasons:
n27 did not identify student needs or preferences
n1 exploring role of tutoring
n2 exploration of teacher perceptions
n1 wrong participants
Articles included in the systematic review (n=36)

Figure 1

Table 1. Search strategy

Electronic databases	Search Strings
ERIC, MEDLINE and CINAHL	1. "Assessment" OR (MH "Needs Assessment") 2. (MH "Formative Feedback") OR "formative assessment" 3. (MH "Feedback") OR "feedback" OR (MH "Feedback, Sensory") OR (MH "Formative Feedback") OR (MH "Feedback, Psychological") OR (MH "Biofeedback, Psychology") 4. (MH "Feedback") OR (MH "Feedback, Sensory") OR (MH "Self-Assessment") OR (MH "Formative Feedback") OR "assessment feedback" 5. "assessment tools" 6. (MH "Methods") OR "assessment method" 7. (MH "Feedback") OR "critical feedback" 8. "Marking" 9. "grading" 10. "rubric" 11. "assessment rubric" 12. S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 13. (MH "Education") OR (MH "Health Education") OR (MH "Education, Distance") OR (MH "Health Educators") OR (MH "Models, Educational") OR "higher education" 14. (MH "Education, Medical, Undergraduate") OR "undergraduate" 15. (MH "Education, Graduate") OR (MH "Education, Pharmacy, Graduate") OR (MH "Education, Nursing, Graduate") OR (MH "Education, Medical, Graduate") OR (MH "Education, Dental, Graduate") OR "post graduate" 16. S14 OR S15 OR S16 17. (MH "Needs Assessment") OR "needs" 18. "preferences" 19. (MH "Health Knowledge, Attitudes, Practice") OR (MH "Attitude of Health Personnel") OR (MH "Attitude") OR (MH "Attitude to Computers") OR "attitudes 20. (MH "Achievement") OR "achievement" OR (MH "Educational Status") OR (MH "Academic Success") 21. (MH "Motivation") OR "Motivation" OR (MH "Reward") 22. (MH "Learning") OR (MH "Certificate of Need") OR (MH "Verbal Learning") OR (MH "Deep Learning") OR (MH "Association Learning") OR (MH "Learning Curve") OR (MH "Social Learning") OR "learning needs" 23. "specialist needs" OR (MH "Information Services") 24. (MH "Learning") OR (MH "Learning Disorders") OR (MH "Emotional Adjustment") OR (MH "Social Adjustment") OR (MH "Risk Adjustment") OR (MH "Adjustment Disorders") OR (MH "Verbal Learning") OR "learning adjustments" 25. S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 26. S12 AND S16 AND S25

***Example of Medline Search.**

Table 2. Overview of the included studies

Author (year)	Country	Aim	Study Design	Measures	Participants	Level of evidence
Alamis (2010)	Philippines	To explore students' perceptions of written feedback	Cross sectional survey	Measure: Questionnaire design for the context of the study.	n=141 students enrolled second year of English. No further demographic data reported.	C1
Agnello et al (2011)	USA	To explore business students' preferences of leaning and assessment	Cross sectional survey	Measures: Questionnaire developed for the study.	n=387 students (n=206 males, n=181 females). Freshman n=139, Sophomore n=89, Junior n91, senior n=68. Major: accounting n=115, marketing n=101, management n=96, finance n=9, economics n=14, general business n=32.	C1
Atmaca (2016)	Turkey	To explore similarities and differences between student and teacher perceptions of written corrective feedback where English is being taught as a foreign language.	Cross sectional survey	Measures: Questionnaire developed for the study. Cronbach's alpha 0.745.	n=34 students and n=34 teachers. n=34 English teachers (n=31 female, n=3 male). Majority of teachers n=22 (64.7%) were teaching from 1-5 years. n=34 students all freshman in University, aged 18-20, n=6 males, n=28 females.	C1
Ball et al (2009)	UK	Exploration of annotation on essays and its impact on learning and assessment in post-qualified student nurses.	Mixed methods Study	Measures: Questionnaire developed for the study. 3 Focus groups: (n=5, n=2, n=3)	Level 3 post qualified students nurses n=249, staff n=74 involved in assessing post-qualifying modules in the school of nursing. n=124 students (49.8%) completed the questionnaires. n=14 staff (19.4%) completed the questionnaire. No demographic data was reported.	C1
Bijami et al (2016)	Iran	Explores the effect of teacher's feedback on writing performance on undergraduate Iranian students	Mixed methods study	Questionnaire 40 semi-structured interviewed (lasted 20-25 minutes) Questionnaire: feedback questionnaire Cronbach's alpha .818	n=400 undergraduate majoring in English language translation and English literature. n=150 (37.5%) were males and n=250 (62.5%) were females.	C1
Bourgault et al (2013)	USA	To explore nursing students' perceptions of audio and written feedback in clinical assignments	Prospective longitudinal	Measures: Preference questionnaire and V-isual, A-aural, R-read/write, and K-kinaesthetic (VARK) questionnaire	n=8 master nursing students. n=1 African and n=7 Caucasian, age 19 and 36 years (mean of 25 years). No further demographic data reported.	C2
Budge (2011)	Australia	To explore students' preferences to electronic feedback	Cross sectional survey	Measures: Student perceptions of electronic feedback (developed in the context of the study)	n=69 participants via electronic survey. Fashion and textiles discipline. No demographic data was reported.	C1
Burns and Foo (2014)	UK	To explore how international students used feedback	Mixed methods study	Measures: Questionnaire developed for the study.	n=16 students completed questionnaires n=9 in-depth interviews No demographic data was reported.	C2
Cakiroglu et al (2017)	Turkey	Explore the relationship between students' preferences in assessment process and performance outcomes.	Cross sectional survey	Measure: online questionnaire	n=67 first year students (Computing). No other descriptive characteristics reported.	C1
Cakir et al (2016)	Turkey	Exploring students' preferences for formative feedback and its relationship with self-regulation	Mixed methods study	Measures: Preferences towards formative feedback questionnaire. Self-regulated learning skills questionnaires. Interviews with 10 students.	n=137 female and n=68 males Computing education (n=77), Classroom teaching (n=69), Guidance and psychology Counselling (n=25), Mathematics (n=20), Science education (n=14)	C1
Carey et al	UK	Exploration of students'views of	Cross sectional	Measure: Feedback Preference	n=1409. Biological sciences; n=456 (32.4%), social sciences n=363 (25.8%); law n=312	C1

(2017)		assessment and feedback	survey	Questionnaire.	(22.1%); nursing n=268 (19.0%). Level of study: 1 n=579 (41.1%), 2 n=403 (28.6%), 3 n=381 (27.0%). 95.7% were full time students and 1/5 (16.9%) over 24 years old.	
Chokwe (2015)	South Africa	Exploration of student and tutor experiences of feedback amongst English Second Language University students.	Mixed method study	Measures: Questionnaire developed for the study. Focus groups not specified.	n=8 English tutor-markers n=15 essays were reviewed Student participant numbers not reported.	C2
Chung (2015)	Korea	To explore the perceptions of Korean learners' feedback on their written errors	Cross-sectional survey	Measure: Questionnaire developed for the study.	n=105 undergraduate university students n=37 social science, n=39 engineering departments, n=5 in education department and n=19 in English language and literature department. n=69 females and n=31 males, mean age of 21 years (range 18-25) years.	C1
Crews and Wilkinson (2010)	USA	To explore students' perceptions and preferences for visual and auditory assessment feedback	Cross sectional survey	Measure: Questionnaire developed for the study.	n=186 undergraduate business students. 55% males and 45% female. 87% were aged 23 years or less. 77% seniors, 51% juniors, 10% sophomores, 1% freshmen.	C1
Dawson et al (2018)	Australia	To explore perceptions of student feedback	Qualitative study	Measures: 2 open ended questions as part of a questionnaire survey.	n=323 (total students invited 400) No demographic dates reported.	C1
Douglas et al (2016)	Australia	To explore students' experiences of feedback	Cross sectional survey	Measures: Questionnaire developed for the context of the study.	n=79 first year education studies, n=104 first year health sciences students, second year n=304 nursing students (response rate of 55%) No demographic data reported.	C1
Duers et al (2009)	UK	Exploration of student nurses' experiences of formative feedback	Qualitative study	Focus groups.	Purposive sample n=10 within final 6 months of undergraduate pre-registration nursing course. No further demographic details reported.	C1
Edeiken-Cooperman and Berenato (2014)	USA	Exploring students' perceptions of handwritten and electronic feedback	Cross sectional survey	Measure: Electronic questionnaire developed for the study.	n=236 students invited, n=42 responded (18%). Educational majors. Freshman n=6, Sophomore n=7, Junior n=20 and Senior n=9. 100% females, 18-22 years. No further demographics reported.	C1
Giles et al (2017)	Australia	To explore nursing students needs and preferences of written feedback	Cross sectional survey	Measure: Feedback Preference Questionnaire.	n=273 students invited, n=248 (90.8%) undergraduate nursing students on their final summative assignment. No demographics were reported.	C1
Hounsell et al (2007)	UK	Exploration of guidance and feedback given to students	Mixed methods study	Questionnaire: The experience of teaching and learning questionnaire Interviews: n=69 Focus groups: n=23	n=782 first and final bioscience students. No further demographic data reported.	C1
Higgins et al (2010)	UK	To explore the role of assessment and feedback in students learning	Mixed methods study	Measures: questionnaire designed for the context of the study Interviews: n=19 (Business and humanities)	n=95 (response rate of 77%) students had divergent ages, gender, background and disciplines. No demographic data was provided.	C1
Lizzio and Wilson	Australia	To explore students' perceptions of written work	Mixed methods study	Qualitative data: students written descriptions of quality of	n=277 science, psychology, criminology, engineering (various levels).	C1

(2008)				feedback received (content analysis of 238 written comments) Survey – 7-point Likert scale.	No further demographic data presented.	
Mattliainen (2015)	Sweden	To determine teachers and students' attitudes and experiences of using an electronic assessment tool in supervision of clinical training.	Mixed methods study	Interviews lasted 1.5-2 hours. Questionnaire sent to 430 and 112 students responded.	n=112 nursing students (83% response rate), 20-25 years and 95% female. Teachers n=12 aged 30-56 years ad work experience of 2 to 27 years, all female.	C1
Mirriahi and Alonzo (2015)	Australia	Exploring student's IT preferences	Cross-sectional survey	Measures: Student IT experience questionnaire	n=334 consented, n=171 completed the survey. Business (37.9%), engineering (19.1%) and these rest of the participants were from other academic disciplines not reported. 1st year undergraduate (32.06%), 2nd/3rd year undergraduate (28.63%), Final year undergraduate (15.27%), Postgraduate (24.05%).	C1
Parkes and Fletcher (2017)	Australia	To explore computing students' perceptions of audio recorded feedback	Prospective longitudinal	Measures: Feedback Preference Questionnaire.	n=752 students invited, n=225 completed survey responses. n=158 females, n=61 males. Response rated over time not reported and attrition.	C1
Parker and Winstone (2016)	UK	Explore students' views on interventions to support student engagement with assessment feedback	Qualitative study	11 focus groups (each 2-4 students)	Psychology students. No demographics data reported.	C1
Perera et al (2008)	Malaysia	To explore formative feedback with medical students and faculty members of staff	Mixed methods study	Measures: questionnaire developed for the study Focus group: no details provided.	n=407 undergraduate medical students (response rate 90.4%), n=51 teachers (response rate of 40.5%). No demographic data reported.	C1
Pokorny and Pickford (2010)	UK	To explore student perceptions of feedback	Qualitative study	Qualitive data: 4 focus groups.	n=18 business students No further demographic data presented	C1
Poulos and Mahony (2008)	Australia	To explain perceptions of useful feedback practices	Qualitative study	Qualitative: 4 focus groups	Participant numbers not reported. Health Sciences students. No demographic data presented	C1
Race and Williams (2018)	USA	To explore nursing students' perceptions of audio and written feedback in clinical assignments	Cross sectional survey	Measures: Preference questionnaire	n=17 (26% response rate). n=14 females, n=3 males, n=14 enrolled in junior level medical-surgical nursing clinical course. n=3 enrolled in a research course. Ages 18-39 years	C1
Shallenbarger et al (2018)	USA	To explore student nurses self-assessed ability to demonstrate knowledge, skills and attitudes to scholarly writing.	Cross-sectional survey	Measure: The Students Self-Assessment of Knowledge, Skills and Attitudes for Academic Writing.	n=125 undergraduate student nurses (112 females and 13 males). Age 18-40 years. Nine different states in USA. n=117 full-time students, n=90 Caucasian.	C1
Siow (2015)	Malaysia	Exploring the perceptions of self and peer assessment in students learning experience	Prospective longitudinal survey	Measure: not reported.	n=62 food science students. No further participant characteristics presented.	C1
Sulaiman et al (2017)	Malaysia	Explore student preferences toward audio and video method in listening assessment.	Quantitative (pre and post-test)	Measures: Visual, Auditory and Kinaesthetic Questionnaire, Multiple Choice Questionnaire and unspecified Questionnaire.	n=150 first semester from (Film, Theatre and Animation, Sports and recreation, Music and Art and Design)	C1
Watkins et al (2014)	UK	Exploration of healthcare students' perceptions of electronic feedback through GradeMark®	Mixed methods study	Measures: questionnaire developed for the context of the study. Focus group: n=27 students (n=18 dentistry, n=6 nursing and n=3	Undergraduate healthcare students: Dentistry n=47 of 63 (75%) Medicine n=57 of 100 (57%) Nursing n=73 of 133 (55%).	C1

				medical students).	No further demographic data reported.	
Weaver (2006)	UK	To explore students' perceptions of written feedback	Mixed methods study	Measures: Questionnaire design for the context of the study. Discussion with 22 students, qualitative methods not clear.	n=170 business and n=340 art and design students invited, n=44 responded (response rate of 8%) Male n=20, female n=24, Age <20 years n=12, 20-22 years n=9, >22 years n=23. Course year: 1st years n=14, 2nd year n=9, 3rd year n=21.	C1
Weinstein and Wu (2009)	USA	Exploring the effectiveness of readiness assessment tests and frequent quizzes.	Prospective longitudinal survey	Measures: Student perception questionnaire and Index of Learning Styles.	n=51 students (29 women and 22 men) Upper level psychology course "The psychology of fear and stress". Class met twice per week. n=15 students did not complete all the 4 surveys and were excluded.	C1

Table 3. Quality appraisal of primary studies

Qualitative Article	Item number of checklist														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Dawson et al (2018)	2	1	0	0	0	0	0	1	1	0	1	1	1	0	1
Duers and Brown (2009)	2	2	1	1	1	0	1	1	0	1	1	2	1	1	2
Parker and Winstone (2016)	2	1	0	0	0	0	1	1	0	0	0	0	0	0	1
Pokorny and Pickforn (2010)	2	1	0	0	0	0	0	1	1	0	0	0	1	0	1
Poulos and Mahany (2008)	1	1	1	0	0	0	0	1	1	0	0	0	0	0	1

\Item number check list key*: 1 research question clearly described, 2 qualitative method appropriate, 3 setting/context clearly described, 4 sampling strategy clearly described, 5 sampling method likely to recruit all relevant cases, 6 characteristics of the sample provided, 7 rationale of sample size given, 8 methods of data collection clearly described, 9 method of data collection appropriate for research question and paradigm, 10 has researcher verified data (e.g. by triangulation), 11 data analysis methods clearly described, 12 data analysis methods appropriate, 13 competing accounts/deviant data taken into account, 14 to what extend is the researcher reflective, 15 interpretations and conclusions supported by the data.

Quantitative Article	Item number of checklist																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Alamis (2010)	2	2	0	0	N/A	N/A	N/A	N/A	2	N/A	0	1	0	0	N/A	N/A	2
Atmaca (2016)	2	1	0	1	N/A	N/A	N/A	N/A	1	N/A	1	1	1	1	N/A	N/A	2
Angello et al (2011)	2	2	1	1	N/A	N/A	N/A	N/A	1	N/A	1	1	1	1	N/A	N/A	2
Budge (2011)	2	1	0	0	N/A	N/A	N/A	N/A	1	N/A	1	1	1	1	N/A	N/A	2
Bourgault et al (2013)	2	1	0	2	N/A	N/A	N/A	N/A	1	N/A	1	1	0	0	N/A	N/A	2
Carey et al (2017)	2	2	2	1	N/A	N/A	N/A	N/A	1	N/A	1	1	1	1	N/A	N/A	2
Cakiroglu et al. (2017)	1	1	0	0	N/A	N/A	N/A	N/A	0	N/A	0	1	1	1	N/A	N/A	2
Chung (2015)	2	1	1	1	N/A	N/A	N/A	N/A	1	N/A	1	1	1	1	N/A	N/A	1
Crews and Wilkinson (2010)	2	2	2	1	N/A	N/A	N/A	N/A	1	N/A	1	1	1	1	N/A	N/A	2
Douglas et al (2016)	2	2	0	0	N/A	N/A	N/A	N/A	1	N/A	0	1	1	0	N/A	N/A	2
Edeiken-Cooperman and Berenato (2014)	2	1	1	1	N/A	N/A	N/A	N/A	1	N/A	0	1	1	1	N/A	N/A	2
Giles et al (2016)	2	2	1	0	N/A	N/A	N/A	N/A	1	N/A	0	1	1	1	N/A	N/A	2
Marriahi and Alonzo (2018)	2	1	1	1	N/A	N/A	N/A	N/A	1	N/A	1	1	0	1	N/A	N/A	2
Parkers and Fletcher (2017)	2	2	1	1	N/A	N/A	N/A	N/A	1	N/A	1	1	1	1	N/A	N/A	2
Race et al (2018)	2	1	1	1	N/A	N/A	N/A	N/A	1	N/A	1	1	1	0	N/A	N/A	1
Shallenbarger et al (2018)	2	2	1	1	N/A	N/A	N/A	N/A	2	N/A	2	2	2	2	N/A	N/A	2
Siow (2015)	2	1	0	0	N/A	N/A	0	N/A	0	N/A	1	1	1	1	N/A	N/A	1
Sulaiman et al (2017)	2	2	1	0	N/A	N/A	0	N/A	1	N/A	1	1	2	1	N/A	N/A	2
Weinstein and Wu (2009)	2	2	1	1	N/A	N/A	1	N/A	1	N/A	2	2	2	1	N/A	N/A	2

Item number check list key*: 1 is the hypothesis/aim/objective clearly described, 2 is the study design well described and appropriate, 3 method of patient/control group selection clearly described, 4 characteristics of the patient/control group clearly described, 5 were patients randomised to the intervention group, 6 was randomisation/allocation concealed, 7 characteristics of patients lost to follow-up clearly described, 8 intervention clearly described, 9 main outcome measures clearly described, 10 was an attempted made to blind those measuring the primary outcome of the intervention, 11 population characteristics adequately described and controlled, 12 main findings clearly described, 13 methods of analysis appropriately and clearly described, 14 estimates of variance reported for main results, 15 analyses adjusted for different lengths of follow-up, 16 data analysed according to intention to treat principle, 17 conclusions supported by the results

Mixed Methods Article	Item number of checklist						
	1	2	3	4	5	6	7
Ball et al (2008)	2	2	0	1	2	2	0
Burns and Foo (2014)	2	2	0	0	2	2	0
Bijami et al (2016)	2	2	0	0	2	2	0
Cakir et al (2016)	2	2	1	1	1	1	1
Chokew (2015)	2	2	0	0	0	2	0
Higgins et al (2010)	2	2	0	2	2	2	0
Hounsell et al (2008)	2	2	0	0	2	2	0
Lizzio and Wilson (2008)	2	2	2	0	2	0	0
Mettiainen (2015)	2	2	0	0	1	0	0
Perera et al (2009)	2	2	0	2	2	0	0
Waever (2007)	2	2	0	0	1	1	1
Watkins et al (2014)	2	2	2	2	1	2	2

Item number checklist key*: 1 are there clear research questions?, 2 Do the collected data allow to address the research question?, 3 is there an adequate rationale for using a mixed methods design to address the research question?, 4 Are the different components of the study effectively integrated to answer the research question?, 5 Are the outputs of the integration of the qualitative and quantitative components adequately interpreted?, 6 Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?, 7 Do the different components of the study adhere to the quality criteria of each tradition of the met?

*Three levels of assessment quality scores

Low risk of bias (2)
Unclear risk of bias (1)
High risk of bias (0)

Table 4 Themes related to student needs for feedback

Super-ordinate theme	Preferences							Psychological aspects		Multimodality feedback
Sub-theme	Balanced positive and negative feedback	Directed Feedback	Linguistic clarity and legibility	Feed forward	Personalised feedback	Grade Justification	Timeliness of feedback	Student preferences embedded as part of assessment process	Emotional aspects	Platforms of feedback
Alamis (2010)	✓	✓	✓	✓	✓	✓			✓	✓
Agnello et al (2011)										✓
Atmaca (2016)	✓	✓			✓				✓	
Ball et al (2009)	✓	✓		✓					✓	
Bijami et al (2016)		✓		✓						
Bourgault et al (2013)	✓		✓		✓					
Budge (2011)		✓	✓	✓	✓	✓				
Burns and Foo (2014)			✓	✓	✓	✓			✓	
Cakiroglu et al (2017)								✓		
Carey et al (2017)		✓		✓	✓					✓
Cakir et al (2016)	✓		✓							
Chung (2015)		✓								
Chokwe (2015)	✓	✓	✓	✓					✓	
Crews and Wilkinson (2010)		✓			✓			✓	✓	✓
Dawson et al (2018)	✓			✓		✓			✓	✓
Duers et al (2009)	✓		✓	✓						
Douglas et al (2016)		✓		✓	✓		✓			✓
Edeiken-Cooperman and Berenato (2014)		✓	✓	✓	✓				✓	✓
Giles et al (2017)						✓		✓		
Higgins et al (2010)	✓	✓		✓		✓				
Hounsell et al (2007)		✓								
Lizzio and Wilson (2008)	✓	✓	✓	✓					✓	✓
Mattliainen (2015)		✓								
Mirriahi and Aloonzo (2018)										✓
Race and Williams (2018)		✓		✓						✓
Parkes and Fletcher (2017)		✓		✓				✓		

Parker and Winstone (2016)		✓				✓			✓	✓
Perera et al (2008)		✓	✓	✓		✓		✓		✓
Pokorny and Pickford (2010)	✓	✓	✓	✓	✓	✓	✓		✓	✓
Paulos and Mahony (2008)		✓		✓	✓	✓	✓			✓
Shallenbarger et al (2018)				✓					✓	
Siow (2015)								✓		
Sulaiman et al (2017)			✓							
Watkins et al (2014)		✓								
Weaver (2006)	✓	✓		✓		✓			✓	
Weistein and Wu (2009)		✓		✓						