What shapes students' perceptions of group work: personality or past experience?

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Abstract

Purpose – Group work (GW) as a collaborative learning method for university students is a much-researched topic in the literature. However, a fairly neglected area is that of students' perceptions of the same. This study purports to bridge this gap in the extant literature via identifying the determinants of these perceptions.
Design/methodology/approach – Using primary data gathered from a sample of 443 university students, the study applies the structural equation modeling (SEM) to estimate the impact of both personal traits and past experiences on the students' perceptions.
Findings – The SEM results reveal that students' perceptions of GW are determined by their relevant past experiences not by their personalities. This position is contradictory to other relevant studies undertaken thus far.
Practical implications – Accordingly, the study stresses the need for educators to create positive group experiences among students and to convert their past negative experiences into positive ones.
Originality/value – Whilst group work holds significant learning benefits for students, negative perceptions about this rich method could eventuate in students refraining from participating in the same. By isolating the determinants associated with students' negative perceptions of GW, this study provides educationists with a strong case for developing suitable interventions aimed at enhancing students' positive perceptions of GW, and resultantly further maximizing its potential benefits.

Keywords Perceptions, Higher education, Group work, Personal traits, Past experiences, Structure equation modeling

Paper type Research paper

1. Introduction

Group work (GW) is a teaching method that enhances cooperation and teamwork, that allows for students to construct knowledge, and to perform tasks collaboratively (Rance-Roney, 2010). Working in groups allows students to learn within an interactive environment, where they are more engaged, learn interdependently and cooperate with others to achieve common goals, possibly unattainable individually (Sajedi, 2014; Hammar Chiriac, 2014; Gölmleksi'z, 2007).

Academic research has highlighted the role of GW in supporting the learning process since the early 20th century (Lou *et al.*, 1996; Gillies and Boyle, 2011). It provenly has been among the best of active learning practices (Burke, 2011). The method holds significant benefits, both at the educational and at the future career level. As part of the education process, researchers and educators believe that group work promotes cooperation, which translates to group members sharing their knowledge, opinions and ideas to promote mutual learning. It fosters critical thinking skills, encourages individual accountability and improves problem-solving strategies (Daba *et al.*, 2017). Further, it enhances debating skills, mutual

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understanding and engagement (Johnson and Johnson, 1986; Gibbs, 2009; Henderson *et al.*, 2017).

As regards students' future careers, there is strong evidence of group working skills boosting graduates' employability. Employers prefer college graduates who can effectively perform within teams, a quality they much value in graduates (Blowers, 2000; Bennett, 2002; Branine, 2008). Such thinking is reinforced by Mosher (2013), who claims that the ability to demonstrate team player traits is a core skill for students embarking on their working careers. This is so, as group work equips students with the several real-life skills required in the workplace, such as collaboration, negotiation, conflict resolution, accurate planning, time management, leadership, delegation and commitment. Further, empirical studies evidence the association between effective group working skills, and higher performance, more positive attitudes, and error reduction (Earley and Mosakowski, 2000; Morey *et al.*, 2002; Mullen and Copper, 1995).

The literature highlighting the manifold benefits of GW is rich. However, there is a lack of studies that have examined students' perceptions of this learning method, aimed at enhancing the usefulness of the same. While positive perceptions can increase the benefits that accrue from GW, negative ones – for instance, arising from situations where no cooperation occurred – could either diminish these benefits or cause students to refrain from participating in group work, and thus miss all potential gains. Our study aims at bridging this gap in the literature by shifting the focus from GW's outcomes to students' perceptions of the same. This is achieved by an investigation of two of the main determinants of students' perceptions of GW : personal traits (personality) and students' past experiences with group working. Resultantly, we seek to unravel whether students' negative perceptions of GW are attributable more to their personalities or to other influential factors determining perception. By so doing, we hope to provide educationists with a strong case for developing suitable interventions that enhance students' positive perceptions of GW, and resultantly further maximizing the potential benefits of this learning method.

2. Literature review

The benefits of group working as an effective learning strategy for students are well documented in the literature. Whilst teamwork – in a broader sense – has been found to enable goal achievement not possible individually (Jensen *et al.*, 2015; Clarke, 2003), there is an abundance of research that examines the applicability and efficacy of this idea within the context of students' learning. Scholars such as Winchadee (2005) opine that cooperative learning encourages students' interaction in small groups aimed at achieving specified group objectives. Further benefits of GW include knowledge sharing among students of different levels of academic performance and backgrounds (Badache, 2011; ElMassah, 2015), enhancing students' understanding (Johnson, 2005; Hendry and Davy, 2005), improving learning and achievement levels (Gömleksi'z, 2007; Al-Sheedi, 2009), restructuring students' previous opinions and thinking about the same issue in different ways (King, 2002), raising students' cognitive skills and helping them retain knowledge longer than earlier (Hull,1985), polishing students' communication skills that facilitates learning from other group members (Smith and Bath, 2006; Gibbs, 2009), supporting critical thinking, interactive and debating skills (Dawson, 2011; Totten *et al.*, 1991; Johnson and Johnson, 1986), engaging students and allowing them to showcase their responsibility for their own learning (Badache, 2011).

Lending further credibility to the case for group working as an effective pedagogical technique for university students are scholars such as Pillay and James (2013, 2014), whose research highlights the various benefits of face-to-face learning that are wholly applicable to the context of students working in groups within a common physical space. A few of these benefits include interpersonal skills, ability to use humor, interaction management,

relationship building and cultural empathy, all of which contribute toward the development of intercultural competence (Pillay and James, 2015), which along with teamwork and problem solving are the key traits required of 21st-century managers and for students seeking employment upon completion of their formal education.

Building further on the preceding, and providing us with a more nuanced understanding of various other facets of GW, is the research of Wilson *et al.* (2018). These authors draw upon the work of several other scholars to foreground various aspects of GW, such as when not to use the same; how to form groups; whether to form permanent or temporary groups; what instructors could do, to promote quality GW experiences and what tasks are ideal for promoting GW.

What seemingly has been underplayed, however based on the literature discussed thus far, is the relative scarcity in the quantum of empirical studies examining the topic of perception – specifically from the standpoint of students' perceptions of GW – and the associated determining variables. A few examples of studies – of the several that abound – that examine the main factors influencing perception, in general, would include those of Keltner *et al.* (1993), according to whom perception is determined by individual values, ethics, fears, needs, emotions and experiences; and others, such as Assael (1992) and Pickens (2005), who maintain that one's perceptions are shaped by past experiences, personal traits and the environment. Contributions of the few noteworthy scholars to the literature on perception – dealing specifically with the topic of the determinants of students' perceptions of GW – are now briefly discussed. Whilst Li and Campbell (2008) posit that the determinants of students' perceptions of GW are affected by their relations with other group members, others, such as Brookhart (2017), argue that some students are concerned about the grading of group-based assignments, since, despite the effectiveness of GW, the same might deter the advancement of an individual's work ethics and motivations, if it allows for "social free riding" (Wilson *et al.*, 2018) and for passengers who do not expend due effort within the group (ElMassah, 2018). Further, Grzimek *et al.* (2014) claim that high-GPA students prefer working in small groups and being graded individually and to belong to high-performance groups. Two conspicuous features that characterize the thin strand of literature on the determinants of students' perceptions of GW include the roles of personal traits and past experiences of students. These are discussed below.

Researchers such as Barrick and Mount (1996) opine that students with more friendly personalities enjoy social interactions and, therefore, GW. Arguably, therefore, personal traits are a strong factor that impact students' perception of GW (ElMassah and Fadly, 2017). Somewhat at odds with these views, are alternative ones that argue that a critical determinant of students' perception of GW, is their past experience with it. Supporting such thinking are scholars like Duncker (1939), who broadly believe that past experience acts as 'the power of learning' and explains several things, including behavior, attitude and perception.

There are several other researchers who further extend this debate on personality traits vis-à-vis past experiences in terms of GW. For example, scholars cementing the argument in favor of the role of personality traits, include Thompson *et al.* (2008), Cantwell and Andrews (2002) and Forrester and Tashchian (2010), to name a few. These scholars maintain that GW orientation is affected by personality differences, whereby group members are more successful, comfortable and satisfied working collectively rather than individually. Higher levels of preference for GW are associated with higher levels of sociability and lower levels of social anxiety. They further opine that students' personalities affect their attitudes toward GW, with positive perceptions of GW characterizing the social, cheerful and high-spirited students and negative perceptions being associated with nervous students who feel inferior to others. On the contrary, those advocating the broad cause for past experiences having a bearing on perceptions, include researchers such as Lee (1970) who states that individuals create their perceptions of the surrounding world, meaning, that different people might have different perceptions of the same thing if they have different experiences and backgrounds.

We extrapolate such thinking to the context of GW and juxtapose the same alongside arguments of Peterson and Miller (2003), who conclusively prove that negative students' perceptions of GW result from their negative past experiences with free riders within group projects. They further claim that offering a guarantee of punishing free riders and ensuring fair participation of all team members can eventually alter students' negative perceptions of GW. Hansen's (2006) study of 34 business students to investigate their perceptions of GW revealed that students' positive perceptions owed to positive past experiences with group projects that included successful experiences, such as participation of all group members, clear identification of project goals and the presence of clear leadership. Cementing these contentions is Hammar Chiriac (2014) whose work demonstrates the significant role played by past experiences in shaping student's perceptions, and yet others, including Cooley *et al.* (2015) and Hollins (2015), who advocate that students with negative perceptions of GW are mainly unfamiliar with effective GW practices.

Whereas the foregoing contentions seem to suggest that personal traits and past experiences both play a role in shaping students' perceptions of GW, there is a body of work that synthesizes, and also facilitates a comparison and contrasting of both these somewhat interrelated viewpoints. Scholars such as McAdams and Pals (2006); Roberts and Wood (2006) and Heller *et al.* (2009) claim that the recognition and memories of life experiences might influence our thoughts, feelings, behaviors and, accordingly, personality traits. Further, personality traits can change and develop from the accumulation of daily situations and behaviors – in other words experiences – over time.

3. Methodology

3.1 Design

The study will estimate the impact of students' personal traits and past experiences (independent variables) on their perceptions of GW (dependent variable). Students' expected outcomes of GW will be used as a proxy of perception, whereby outcome expectations are the rewards expected by group members, given their belief that their cooperation facilitates goal achievement (Hall *et al.*, 2012). Positive outcome expectations represent positive students' perceptions of GW, which resultantly encourage them to share their knowledge with their group members. Similarly, negative expectations represent negative perceptions.

The study uses the structural equation modeling (SEM) to test the impact of both independent variables, as shown in Figure (1).

SEM is a comprehensive statistical approach for testing hypotheses and understanding patterns of correlation/covariance among a set of measured variables and latent ones, meaning, non-measured variables or common factors (see Hoyle, 1995; Kline, 1998; and Hershberger, 2003). SEM is considered a more flexible method compared to the traditional regression techniques, as it offers no default model, and places few limitations on specified relations. It also resolves problems of multicollinearity and allows for multiple tests to determine model fits, such as chi-squared, comparative fit index (*CFI*) and the standardized root mean square residual (SRMR).

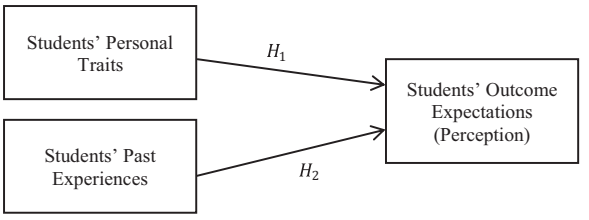

Figure 1.
SEM design

3.2 Hypotheses

Consistent with the research objectives, we test the following hypotheses:

H0. Personal traits do not affect perception about GW

H1. Personal traits affect perceptions about GW

H00. Past experiences do not affect perceptions about GW

H2. Past experiences affect perceptions about GW

3.3 Methods and data

The study uses a survey as a quantitative tool to collect primary data on students' perceptions of GW. The survey was structured into three sections; one for each of the model's variables, of which one independent variable is a scale variable (past work experience – 10 questions [1]), and the other independent variable is an ordinal one (personal traits – 3 questions [2]). The dependent variable (outcome expectations [3]) is also a scale variable. The students' population comprises higher education students at Zayed University in the UAE. We used random stratified sampling to identify 450 students for our analysis. Our sample has a homogenous context in terms of culture [4], gender [5] and age group [6]. To test the reliability of the survey instrument, we sent the pilot questionnaire for feedback on the clarity of wording, survey structure and other possible omissions, to several academic-researcher colleagues as well as persons familiar with the topic. After the trial, we visited various classes and distributed the survey among the target group (450 students), along with a consent form and a confidentiality letter. We removed seven of the 450 responses from our sample as they declined our request to take the survey. This elicited a response rate of 98.4%, with the final sample size reaching 443 responses.

To estimate our SEM model, we adopted the partial least squares structural equation modeling (PLS-SEM), which is a variance-based method that aims at maximizing the explained variance of the endogenous latent variables (Mike *et al.*, 2016). Recently, PLS-SEM became popular in social science research since it operates much like multiple regression analysis with the ability to handle small-sized samples [7], non-normality of data [8] that could result from scaling of variables [9], or the limited sampling of subjects (Shumacker and Lomax, 2016), and formatively measured constructs [10] (Hair *et al.*, 2014).

Several software programs are available to estimate PLS-SEM, such as LVPLS (Lohmöller's, 1987), PLS-Graph (Chin, 2003) and VisualPLS (Fu, 2006). Recently, SmartPLS has been widely adopted to estimate the PLS-SEM (Ringle *et al.*, 2005, 2015). As of date, version 3 of SmartPLS which has been recently released is considered the most comprehensive and advanced program in the field (Hair *et al.*, 2017). Moreover, one of the proposed model's independent variables is ordinal, which makes for SmartPLS being a right choice, as it allows for the incorporation of the ordinal variable into SEM by using its dummy values.

The first step of adopting PLS-SEM includes creating a path model that connects variables and constructs (latent variables) based on theory and logic (Hair *et al.*, 2014). Path model is a diagram that visually displays the hypotheses that will be tested (Hair *et al.*, 2017). The path model is represented in Figure (6).

4. Results

4.1 Descriptive statistics

Table (1) shows that on a scale of 1–4 (where 1 represents the lowest importance and 4 represents the highest) the average response of the students about their past GW experience is 2.918, and their average response for expected outcomes from the same is 2.832. SD – data

dispersion from the mean point – of outcome expectations is relatively large (0.415) compared to that of past experiences (0.396). The skewness of students' past experiences and outcome expectations are −0.762 and −0.342, respectively. The negative sign shows that data distribution is skewed toward the left side. The kurtosis of students' past experiences and outcome expectations are 1.591 and 1.407, respectively.

4.2 Normality tests

The model data are of two different types: "personal traits" that are represented by an ordinal categorial variable, with "past experiences", and "outcome expectations" being represented by scale variables.

Normality was tested for the two scale variables [11] via Q-Q plot and boxplot. All results show that data follow a normal distribution.

Q-Q plot results, represented in Figure (2) and Figure (3), show that data of both "past experiences" and "outcome expectations" are normally distributed.

The boxplot for "past experiences" in Figure (4) shows that data distribution is skewed toward the left, while the boxplot for "outcome expectations" in Figure (5) shows that the data points lying on the upper and lower bars of the boxplot are not critical, and will not deteriorate normality of the model data, except for one critical data point (*27) which might affect the data normality, so this observation was deleted. Since skewness and kurtosis of the data lie within the range of −2 to +2 then the distribution of data is normal (George and Mallery, 2010). Only one data outlier point was deleted to evade its deteriorating impact on the normality of the model data. Deletion of outliers is considered a possible solution if they have an adverse impact on model correlations (Shumacker and Lomax, 2016).

Table 1.
Descriptive statistics

Variable	Mean	SD	Variance	Skewness	Kurtosis
Past work experience	2.918	0.396	0.157	−0.762	1.591
Outcome expectations	2.832	0.415	0.173	−0.342	1.407

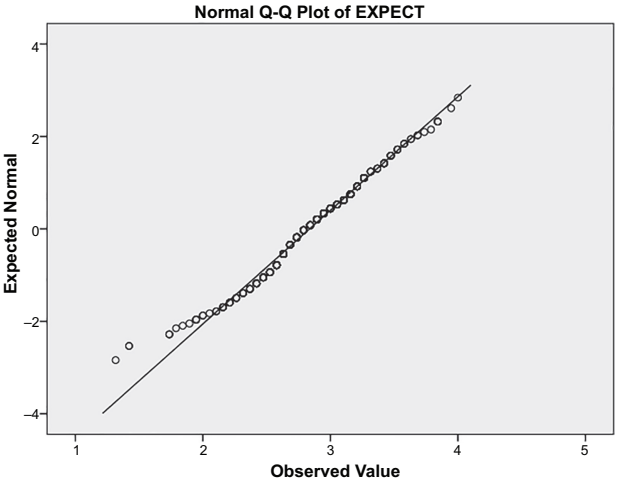

Figure 2.
Q-Q plot for "past experiences"

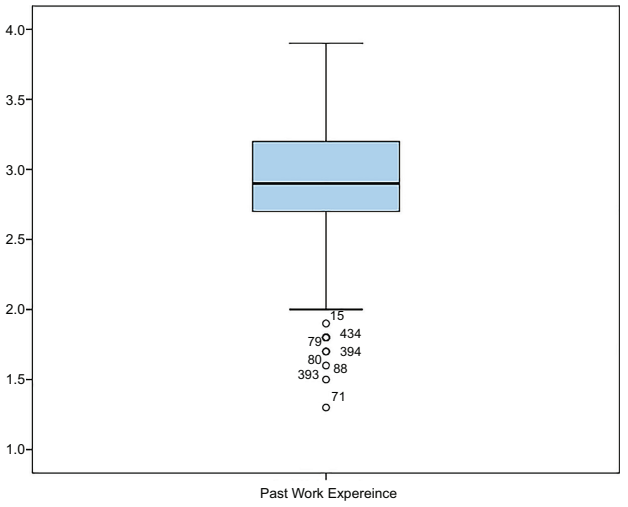

Figure 3.
Q-Q plot for "outcome expectations"

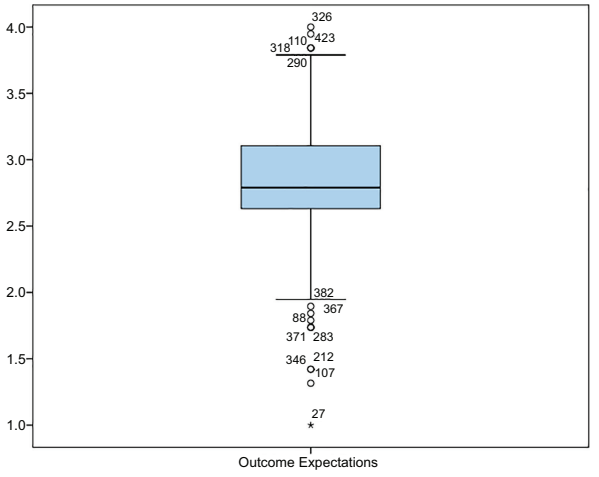

Figure 4.
Boxplot for "past experiences"

4.3 Determinants of perception: SEM results

The initial SEM estimated path model, as plotted in SmartPLS, is shown in Figure (6).

To check the model's goodness of fit, the SRMR was calculated. The SRMR transforms both the sample covariance matrix and the predicted covariance matrix into correlation matrices. It is defined as the difference between the observed correlation and the model implied correlation matrix (Hair *et al.*, 2014). The threshold of an SRMR less than 0.08 is considered a good fit that avoids model misspecification (Henseler *et al.*, 2015). Our calculated SRMR was 0.073, thus representing a good model fit. For validity and composite reliability, all factor loadings were checked. For sample size greater than 200, all items with factor loading greater than or equal to 0.4 can be retained in the model (Hair *et al.*, 1998). As per the initial SEM estimation shown in Figure 6, indicators with factor loadings below 0.4 were deleted as these loadings are considered very low (Bagozzi *et al.*, 1991; Hair *et al.*, 2011). Indicators with

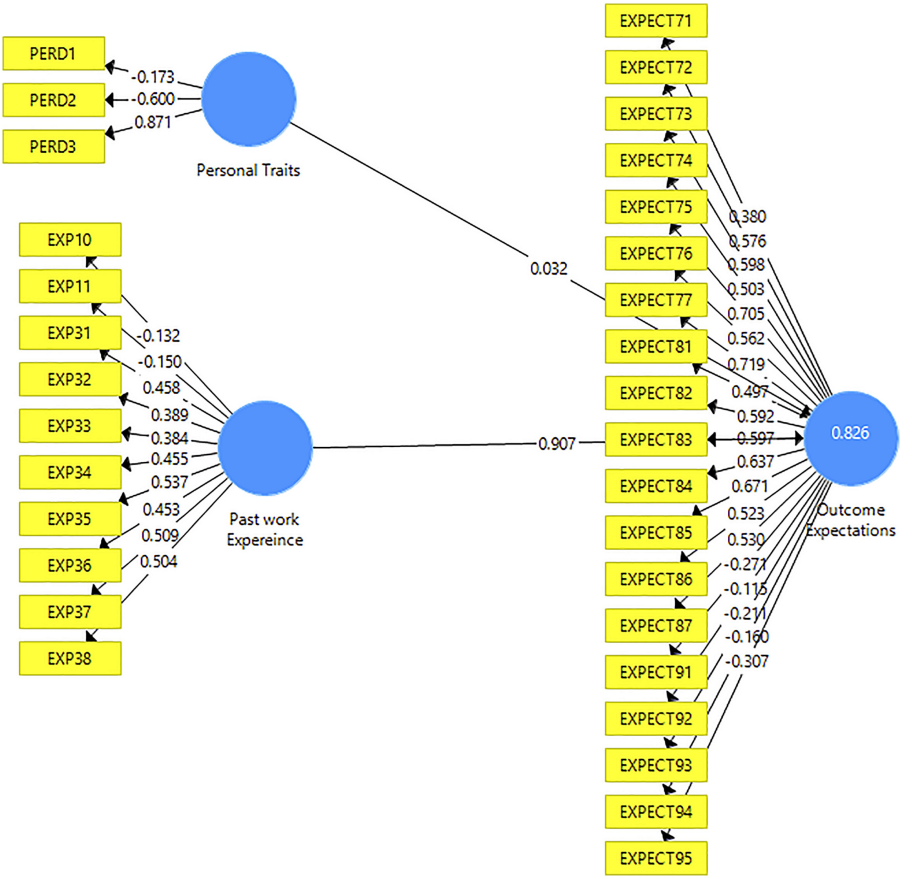

Figure 5.
Boxplot for "outcome expectations"

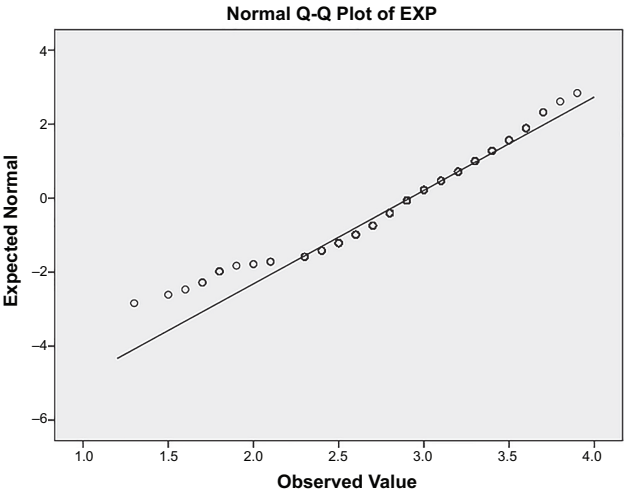

Figure 6.
SEM initial results

loadings greater than or equal to 0.4 were retained. Although indicators with factor loadings between 0.4 and 0.7 are considered low, yet deleting them should only be considered if this leads to an increase in composite reliability or in average variance extract (AVE) [12] (Hair *et al.*, 2017; Ertz *et al.*, 2016). According to Fornell and Larcker (1981), items with AVE less than 0.5 should be deleted, but if the composite reliability of the constructs is greater than or equal to 0.6, then the convergent validity of the items is still present, nullifying the need to delete any further item. This was the case in our estimated model, so we retained all indicators with loadings greater than or equal to 0.4. Accordingly, an updated SEM estimation is shown in Figure (7).

Table (2) shows the composite reliability (CR) that measures the internal consistency of all the items in the updated SEM. Since all constructs have a CR value greater than 0.6, we can say that there is an internal consistency of items on their respective construct (Hair *et al.*, 2009; Kline, 1998).

We used the heterotrait-monotrait ratio of correlations (HTMT) approach to determine discriminant validity of the constructs. Table (3) shows that all values are less than 0.9; thus, all constructs used in the model are unique (Henseler *et al.*, 2015).

4.4 Hypothesis testing

To test the research hypotheses, path coefficients of SEM were computed, with the value of the adjusted R-square of the model being 0.805, which indicates that 80.5% of variability in students' perception is explained by their personal traits and their past work group experience. Table (4) shows that the path coefficient of student's personal traits on their outcome expectations appears to be insignificant (p-value = 0.067). Thus, H1 is not accepted. Meaning, personal traits or personality differences do not have an impact on shaping students' perception of GW. However, results show a significant impact of past GW experience on outcome expectations (p-value = 0.000), with path coefficient 0.894. This

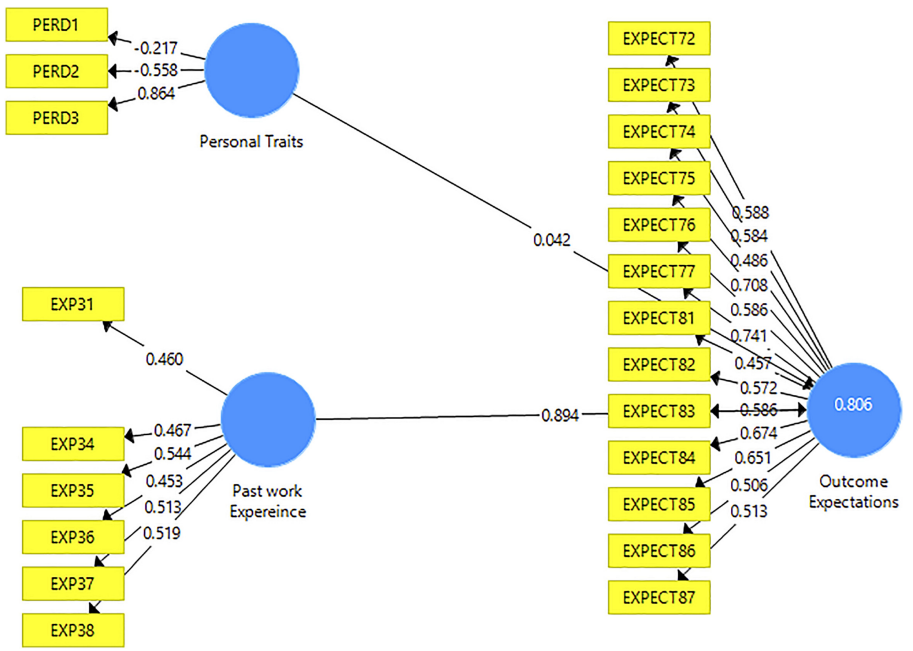

Figure 7.
Updated SEM results

indicates that with one percent increase in students' positive past experiences, there will be an increase of 89.4% in their expected outcomes. Accordingly, H2 is accepted, which means that students' perceptions of GW are determined by their past experiences, with this learning method. Successful past experiences create positive perception of GW, while unsuccessful experiences result in negative perceptions.

5. Discussion and conclusion

Group work has been hailed as "one of the greatest success stories in the history of educational innovation"(Slavin, 1996). It is one of the most extensively used and researched teaching approaches in the classroom (Wilson *et al.*, 2018) and, as such, is utilized as a means for learning at all levels in educational systems (Hammar Chiriac, 2014). Three most commonly cited reasons for the adoption of GW are as follows: that it is an effective form of learning (Slavin, 1996); its capacity for promoting teamwork skills that employers require and value (Cooper and Lybrand, 1998) and that it enhances efficiency in the use of staff time when the student to staff ratios are falling (Sharp, 2006). Additionally, group learning is considered to encourage life-long learning.

Previous research confirms that there are close linkages between how students perceive GW and the benefits of the same (Butt, 2018). According to Burdett and Hastie (2009), how GW is perceived is the strongest predictor of overall satisfaction of this learning method. Similarly, Springer *et al.* (1999) opine that students' satisfaction with GW and effective group performance is contingent upon how they perceive this approach.

Ironically, however – and as discussed in earlier sections of this study – the research literature on GW is rich, the same tends to focus more on the outcomes and benefits of this method, while somewhat neglecting the strands relating to students' perceptions of the same. Also neglected is the role of past experiences in shaping such perceptions. The importance of these latter aspects, if not understood holistically, lies in their ability to adversely impact the efficacy of GW as a learning method (Cantwell and Andrews, 2002). Although these strands have been manifesting increasing interest since the turn of the century (Hamar Chiriac, 2014), there is still a considerable paucity of research in this area.

Table 2. Convergent validity and composite reliability

Variable	Average variance extracted (AVE)	Composite reliability
Past work experience	0.244	0.658
Outcome expectations	0.354	0.875

Table 3. Discriminant validity (HTMT criteria)

	Outcome expectations	Past work experience	Personal traits
Outcome expectations			
Past work experience	0.897		
Personal traits	0.094	0.059	

Table 4. Regression and path coefficients*

Variable	Path coefficient	SD	*p*-value	Decision
Personal traits	0.041	0.098	0.067	Rejected
Past work group experience	0.894	0.047	0.000	Accepted

Note(s): * Dependent variable: outcome expectations

Based on the demonstrated importance of GW, and its multiple attendant benefits coupled with the need for a more nuanced understanding of the role played by students' perceptions in enhancing the method's positives, the aim of this article is to add to the existing knowledge and understanding regarding the main determinants of students' perceptions about this approach to learning. Our study has attempted to isolate the factors impacting this perception, so as to enable educators to better plan their actions required to improve students' opinions about GW so they could maximize their benefits from this learning method.

This study was based on primary data from a sample of 443 university students. It applied the SEM model to estimate the impact of two independent variables (personal traits and past GW experiences) on the dependent variable (students' perception of GW), with GW outcome expectations serving as a proxy.

Our study reveals that past experiences significantly affect students' perceptions of GW (outcome expectations), while personal traits have no significant impact. That is, students' perceptions are shaped and affected by previous positive or negative experiences, while students' personalities and traits do not make much difference.

The importance of this latter point – the insignificance of personal traits – lies in its arguably being at odds with the prior literature (on the generalized aspects of perception) that confirmed the impact of personality on perception, with proponents of the same including authors such as Barrick and Mount (1993), Thompson *et al.* (2008) and Forrester and Tashchian (2010). We adopt the view that there are limitations for generalizing the results of such studies, wherein case-specific factors have been considered, including cultural features, age groups and gender. Our contentions are supported by the literature strands concerning the impact of culture on personal traits and behavior. For example, Shweder (1991) states that global traits are non-existent, since individual behavioral differences are context dependent and are thus non-generalizable across contexts. He further argues that situational comparability becomes limited with more cultural variations. In like vein, Cooper and Denner's (1998) study on the relationship between culture and psychology reveals that personality tests developed within one culture and then applied to other cultures often yield distorted results, given their sensitivity to cultural differences. Triandis and Suh (2002) extend this line of reasoning further, in advocating that personality is shaped by both genetic and environmental influences, so some similarities and generalization of behavior might occur, while simultaneously culture-specific factors have their impact. Our sample has a homogenous context in terms of culture, gender and age group. In summary, and based on the results of this study, and in light of the homogenous context of the study's sample, we arguably cannot blame personality for any perceived negative attitude of students toward GW.

Unlike with the case of personality's interactions with perceptions – on which the literature stands divided as discussed in the foregoing – our study's position on the significant impact of past experiences on students' perception of GW is strongly corroborated by the literature addressing the role of experience in shaping perceptions (Duncker, 1939; Lee, 1970). Quite importantly, it also supports the results of previous empirical studies, and prime examples being those of Hansen (2006), Peterson and Miller (2003), Hammar Chiriac (2014), Cooley *et al.* (2015) and Hollins (2015). These scholars' results demonstrate how positive students' perceptions of GW flow from their positive previous experiences with this method and then result in a virtuous cycle. Students feel encouraged to work within groups subject to deriving positive and successful experiences that reinforce their beliefs in the benefits that would accrue to them from this setting, such as collaboration, sharing experiences, fair participation and grading. Conversely, negative experiences would lead to negative perceptions of GW, eventuating in students refraining from the same, premised on their belief that this is an unfair learning and grading method. Viewed in light of these results, we claim that educators have the potential to change

students' perceptions of GW, by positively affecting their experiences or planning for the creation of new positive ones.

GW provides students with opportunities to incorporate diverse viewpoints and to develop communication and teamwork skills that are important in various professional fields (Lamm *et al.*, 2012). Often, however, working in groups poses varied challenges. The allure of GW would be lost if these challenges remain unchecked, would hamper effective learning and result in poor-quality products, unequal workload distribution and team member conflict (Feichtner and Davis, 1984). Further, failures to consider the pros and cons of GW from multiple perspectives before being deployed as the choice of pedagogical mode, might end up resulting in less than desirable consequences rather than delivering positive experiences and enhanced learning (Gillies and Boyle, 2011; Hammar Chiriac; Granström, 2012).

Our results highlight the need to work on changing students' past experiences in ways that invigorate GW's advantages and limit its drawbacks. Creating new positive and encouraging experiences is a potential method for improving students' perceptions of GW and encouraging them to participate actively within groups. One approach for achieving this is by adequately mentoring students. One possible example of this is to allow individual students within groups to list the positives and negatives of their previous personal experiences with GW, followed by a group leader guiding a brainstorming of potential strategies to evade the negatives and stress the positives, and with an emphasis on conflict resolution strategies. Conflicts form one of the highest risks accompanying GW. The literature cites several conflict resolution strategies, such as setting up crisis clinics, peer rating and exclusion of non-performing group members or getting outside assistance (see Hitchcock and Anderson, 1997; Felder and Brent, 2001). Achieving group consensus and establishing guidelines about these strategies would enhance students' confidence and facilitate their capacity for superior GW.

A fundamental limitation faced by this study lies in its sample used (students of Zayed University, UAE) being part of a highly socio-culturally homogeneous group. This drawback, however, paves the way for future researchers to investigate further aspects of this topic within universities with more heterogeneous student compositions and also with other homogeneous settings different from the one used in this study. Also, comparisons of the determinants of perception across various majors could be explored, to unravel whether students' perceptions of GW vary from one field of study to another. As importantly, other dimensions of personal traits could be explored to check for their significance in determining students' perceptions.

The effects of the COVID-19 pandemic being experienced universally are likely to persist over the foreseeable future. This has resulted in online learning increasingly becoming the norm the world over, particularly with university-level education. This generates rich possibilities for further research, broadly in relation to the perceptions and outcomes of group working in virtual, as opposed to face-to-face scenarios. Further scope also exists for extending such research further to situations involving online GW, within homogeneous and heterogeneous groups, and also drawing comparisons between the results of such studies.

Although the importance of GW and its multiple attendant benefits has been well established, there is a need for a more nuanced understanding of the role played by students' perceptions in further enhancing the method's positives. This study aimed to add to the existing knowledge and understanding regarding the main determinants of students' perceptions about this approach to learning. By attempting to isolate the factors impacting their perceptions, we hope that this study enables educators to better plan their actions required to improve students' opinions about GW, so the benefits from this learning method could be further maximized.

This would logically eventuate in students being provided with essential social and life skills. Resultantly such skills that are considered human capital assets, would increase the employability of students and also raise their level of performance at the workplace.

Notes

1. Including questions about students' evaluation of their success with previous GW experiences, enjoying group assignments and methods used to ensure group members' fair contribution (setting deadlines, meetings, using peer strength, cooperation, mutual agreement and improve communication).
2. Including their willingness to contribute more than a fair share, and how responsible they felt doing GW versus individual assignments.
3. Several questions addressed students' perception of GW via its expected outcomes: (1) students' preferred learning method,(2) benefits achieved from GW (saving time via sharing the workload, better work quality, learning from peers, raising self-confidence, higher grades and preparation for real-life experiences), (3) skills gained from GW (teamwork and communication skills, self-development, time management, academic development, leadership, interpersonal and intercultural communication) and (4) the drawbacks of GW (uneven contributions from group members, relying on others, poor commitment or attitude, poor time management and unfair grading).
4. All students at Zayed University are Emiratis (UAE nationals).
5. All students are females.
6. All students are in the same age group: 18–21 years old.
7. Ensuring higher levels of statistical power.
8. Failing to follow a multivariate normal distribution may cause underestimated standard errors and inflated goodness of fit measures.
9. Ordinal rather than interval.
10. Where indicators affect the constructed variable.
11. No need to test normality of the ordinal variable as it is categorial and not continuous.
12. AVE is a measure of convergent validity on the construct level. It is calculated as the sum of the squared factor loadings divided by the number of indicators. An AVE value of 0.5 or higher indicates that the construct explains more than half of the variance of its indicators. The rest of the variance remains in the error (Hair *et al.*, 2017).

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