Sociometric Mapping for Predictive Performance Analysis: The Measurement of Attitudes of Social Acceptance or Rejection through Expressed Preferences among Members of a Social Grouping

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Abstract The level of group acceptance or rejection through Sociometric preferences was measured and correlated to the Summative performance of a small class of post graduate students studying Human Resource Management. Acceptance above the average score for the social atom indicated a better performing student, whereas students with low acceptance scores were struggled to achieve. No student achieving above average Sociometric preference scores failed, while 30% struggled to achieve pass marks. Additional contributing factors such as ethnicity illustrated areas for further investigation within the research. The central thesis was confirmed and Sociometric performance scores offer scope for the development of praxis into predictive performance analysis.

Keywords Sociometry, Social Atom Theory, Post Graduate, Achieving, Predicting Performance

group to either enhance or weaken the performance of the atom, Alshamsi et al. [3]. Personality traits allow the actors of the atom to select the distance they want to enforce within the group and accordingly the end result could, potentially, be good, bad or varied depending on the circumstances. The unofficial network of relationships and the relative strengths can be viewed accordingly as either a hindrance or a benefit. Predicting which members of the social atom will perform as expected and those that are at risk is the aspect of Sociometry that this paper examines. Where atom members self-select the strength of interaction the result could be detrimental to the individual as well as the collective. Using Sociometric mapping to identify students at risk allows preventative action to be taken to mitigate the loss of atom membership. However, where such actions are used the impact on the wider agency should not be dismissed or overlooked as this to could present implications that are unforeseen.

1. Background

The orchestration of groups and group membership whether purposefully constructed by agency or through normative group behaviour of a social interaction occurs as a normal part of human behaviour. The preferences of actors within a group or social atom are characterized by the relationship distances involved between the actors, Moreno [1]. Distant or weak relationships are contrast against close or strong relationships. Where un-orchestrated membership of a social atom is initially enforced by external actors' such as in the case of students in a Higher Education setting, membership strength of relationships is conditional upon certain factors that can be both individual and collectively centered, Hale [2]. The outcome of such relations allows the network effect of the

2. Rationale

Business schools that offer the student post graduate qualifications are selected based on a number of criteria, some imposed by external agency such as firm sponsors and others by the individual applicant and their circumstances. The choice of provider is often based on multiple criteria such as award, price, location, brand prestige, quality of research, access to world class teaching and learning along with entry criteria as well as other factors not mentioned here but accepted due to the heterogeneous nature of the selection criteria and applicant. Increased competition within the higher education sector from newer universities within host countries and from developing economies has made business schools even more commercially focused as funding streams are reduced

and market regulation offer market opportunities to new competition. With increased coverage of hi-speed broadband internet connections spreading throughout the world the threat has also come from free online courses such as massive open online courses, or MOOCs, that have been offered by some of the world's most recognizable university brands. The need, from both a student centric and commercial viewpoint, is for the organization to attract, recruit, retain and succeed with their endeavours. Student success has therefore become more desirable as word of mouth promotion from positive experiences provides valuable endorsement and no expense positive advertising. However, some students despite meeting entry criteria, passing interviews and providing evidence of previous academic achievement in a related subject struggle to achieve and elect to leave the process or fail to achieve a passing grade.

During three years of empirical observation and based on both formal institutional and informal feedback from students within the class some students could be seen to be struggling to cope with the academic rigour of the masters' degree programme. Despite personality profiling such as the application of Myer's Briggs, [4] and Belbin, [5] team roles, where student profiles were shared and discussed to identify personality traits, strengths and weaknesses, the student body could be seen to be polarized with students self-selecting who they would not only sit with in class but also who they would and would not work with on class activities such as cases and Summative assessments. Students that self-selected their social grouping with minimal connectedness to the social atom, thus demonstrating weak relationships, were noted to be least popular when any group work was assigned. Feedback from students that demonstrated stronger relationships as a whole identified the weakness of their peers as a sign of self-exclusion and unwillingness to engage and contribute. The result was a self-completing and vicious circle where self-excluding students were further excluded from the atom once trust from their peers was lost culminating in a limited learning experience and further reducing opportunities to improve, Rubin et al. [6].

With many students on the course being sponsored by their employer and seeing successful achievement of the programme as a key component in their future career path. As a consequence stopping to assist, or reconnect with these self-excluders through the adoption of mirrored self-exclusion, appeared an unattractive proposition and a high risk to their own chances of success. The view of Alshamsi et al where the strength of the group or atom can be captured for the greater good of everyone could be seen to be effective only when the whole atom has strong relationships, Alshamsi et al. [3]. The perspective from the lecture team was twofold in that they wanted everyone in the class to have a positive experience and that they all achieved. Was the strength of the relationship within the social atom a contributing factor to the success of the

student and if so could performance of the student be predicted based on self-selection preferences using Sociometric mapping?

This paper examines the strength of relationships within a forced social atom environment using Moreno's Sociometric theory and correlated to the individual atom member's performance during Summative assessment, Moreno [7]. The performance of individual social atom member's has been traditionally very good and this paper examines the collective atoms performance in terms of relationship network strength and individual outcomes. High entry criteria to the course via work experience and level along with first degree transcript results indicating performance capability, final award and interview with the course leader has been used to great effect to screen candidates that would not suit the rigours of academic study at post graduate level. However, errors and other personal circumstances can influence a student's performance and this is recognized within the research. Therefore, while the results indicate a positive correlation between Sociometric preferences and performance the paper does not exclude alternative factors from the contributing to the cause. The generalizability of the results therefore is not presented to the reader.

3. Theoretical Perspectives

Sociometry as defined by Moreno provides a simple yet powerful definition;

'The social atom is involving an individual and the people (near and distant) to whom he [sic] is emotionally related at the time'. (Moreno [8] p. 58)

This rather simplistic definition provides the user with more than they need to explore and apply the theory. Through undertaking to apply this definition with more of an inductive theoretical approach the theory allows greater freedom to explore the concepts within the boundary of the atom without restraint. Through this methodological approach the intent is not to test the limits of existing theoretical constructs but to provide concepts that, where tested, will lead to constructs that can later be tested via deduction, Corley and Gioia [9].

'Sociometry is a method for discovering, describing, and evaluating social status, structure, and development through measuring the extent of acceptance or rejection within social groups'. (Bronfenbrenner [10] p. 364)

Bronfenbrenner's definition offers a precise scope of the atom construct in order to frame the group membership and characteristic behaviours of the actors within the atom. However, here Bronfenbrenner builds on Moreno's theory by providing, again a simple, two factor observational frames of reference, acceptance or rejection.

The development of Sociometry by Moreno has evolved with differing views being posited by several authors including but not omitting others not mentioned here,

Hollander and Hollander [11], Hollander [12] and Hale [2], where to construct different approaches to what has largely been accepted as an unstructured or incomplete thought by Moreno himself has emerged. Applying the 'Remerean' conceptual framework of non-pre-determination or adaptation of the Moreno's conceptualization theory and instead seeking knowledge through application of research alone and thus refined as required allows greater knowledge to contribute to the evolution of the theory, Remer [13].

Hale suggests that the nucleus of the social atom or the group, should be viewed via different perspectives according to Moreno's later work such as individually centered and collectively centered in order to define the social atom theory, SAT, Hale [2]. Martin's work on the different perspectives, or 'settings', in which the atom actors are involved examines the relationships between different contexts, specifically formal classroom and informal leisure settings Martin [14]. A two factor examination that was replicated in this papers methodology by chance and not design with this previous author's work in mind. As with Remerean theory, and as stated earlier within this paper, different perspectives, such as Hale's from within the atom are noted, but not included for reason of scope and brevity. The role of network diversity and personality traits can be found amongst the work of Alshamsi et al, should the reader wish to explore the some of the issues and reframe the next phase of the research, Alshamsi et al. [3].

Central to Moreno's definition is the inference of longevity to the relationships formed within the social atom which are characterized by the emergence of collective importance between members of the atom over a period of extended time, Moreno, [8]. Therefore, exclusion, whether self-imposed or applied from within the atom, could greatly reduce the performance of the individual atom member or consequently the collective, Goodacre, [15]. Differences in time frames connected to Sociometry and Social Atom Theory presents two conceptual approaches where Sociometry examines and reflects the changes in relationships and connections between atom members over a short time frame and, social atom theory where relationships and the ongoing maintenance over protracted periods of time are actively pursued. For the purposes of this study Sociometry is given as the theoretical underpinning and the members of the class are viewed as the social atom. At the individual level where exclusion has been imposed from within the social atom on the individual the internalization of that exclusion can have longer-term consequences so early rejection poses a real danger to the future success of the excluded, Burks et al. [16]. Although not identified expressly by Remer, the members of the social atom act as an information clearing house to assist members to locate and use the best sources from within the atom as their needs change over time (Remer, [17]. Whether this is data, expertise or knowledge is left to the

atom actors to define for themselves but, access becomes central to the issue of success and therefore acceptance or rejection again becomes critical to the process, Peretti and McNair, [18]. This reflects the twin concepts of strong and weak Sociometric theory presented by Moreno where the act of not merely presenting a preference for interaction with members of the social atom, weak theory, but is actively followed up on by action, strong theory, and subsequent continued acceptance by other members of the atom that reflects the desire of the atom member seeking acceptance, Remer, [17]. Where acceptance occurs and flourishes the social atom maps individual abilities and skills within the atom allowing cross pollination of ideas and knowledge. Subsequently exclusion therefore restricts access to this thus reducing the overall effectiveness of the atom knowledge-base.

4. The Social Isolate

The social isolate, whether for reasons known or unknown, presents to the social world awkwardness that manifest in varying levels of self-exclusion from society and social interactions at the individual and wider societal level, Peretti and McNair, [18]. Therefore self-exclusion could be viewed paradoxically as behaviour of choice presented by the social isolate to the world. However, Lorber posits that the social isolate has 'no' choices and makes 'no' choices regarding the isolation, Lorber, [19]. Being socially isolated by conditioning, whether known or unknown, the social isolate perceives 'no choice' to behave in any other manner and thus presents behaviour that is perceived as rejection. Members of a social atom, observing perceived rejection by the isolate, then in-turn mirror the behaviour thus segregating the isolate further and present the isolate with 'no' choice to join the social atom. The social isolate has thus rejected and in turn been rejected by the atom. The social exclusion circle is thus completed whether knowingly or unknowingly.

Studies by educational researchers identified the issue of isolation and the impact it has on the student and their educational development noting a lack of motivation and engagement as well as academic performance, Davis, [20] Lott and Lott, [21]. However, the underlying motivation for the social isolate to actively engage in the behaviour is not often unknown and a lack of willingness to explore the motivation behind the expressed isolating behaviour is often left until much later when more serious symptoms present.

The situation for the social isolates at university level and in particular within business courses presents additional problems for the isolate as the requirement from business is for the graduate to be socially adept and be capable of working in a team. Equally the rigours and demands placed upon the student require them to share and challenge ideas within a seminar or as part of a learning

objective. The relationship is also time based with a fixed period of social interaction required at varying levels throughout the span of the course studied. Whilst the ability of individual atom actors to change over time is not the focus of this paper, this does present opportunities for further research in order to develop coping strategies for the management of the social isolate and praxis.

5. Performance

Performance for the student in a social atom can be viewed from different perspectives as the process of using social skills in order to prove one's ability within an artificial and enforced social atom such as work and indeed the university course itself, individual's performance is measured by their own results. Accordingly the requirement to be socially adept is looked for but rarely examined and graded whereas knowledge and individual skills are offered as proof of ability and as a total measure of the individuals performance. So whereas Moreno examines the strength or weakness (near vs. distant) of the relationship by both expression and action, the performance of the atom actor is conditional upon multiple criteria that influence the action, Moreno, [8]. The criteria influencing these actions may be transient, an unexpected issue arising that consumes the actor's immediate attention, and changes their Sociometric relationship strength temporarily, or they may be habit forming as part of a new set of different Sociometric contextual factors such as through the family atom or personal relationship atom, as part of a new pattern and Sociometric strength that is still forming. Equally, these may play no or a limited part in the evolution of the behaviour, Paretti, [22] and Paretti and McNair, [18].

Performance of the individual however, is conditional on passing the course and as such much attention is placed upon this especially when it comes to post graduate study and where external reward or conditions are placed upon the student such as promotion or payment of course fees. Achieving the correct result is therefore often viewed as the priority and any factors that threaten the achievement of that result is dealt with harshly by members of the social atom. The actions of strong (near) relational atom actors can therefore be seen as self-reinforcing for actor's viewed equally within the atom and self-reinforcing of exclusion by the weaker (distant) atom actor as they struggle to feel worthy of the stronger atom, Hale, [2], and Paretti and McNair, [18]. Consequently students with weak social atom connections would be at risk of missing out on the knowledge and learning experience of the whole social atom. As a result the student would potentially be at risk of achieving to the desired level expected, Farmer et al. [23].

6. The Current Study

The purpose of the study was to identify students at risk

of poor performance based on their Sociometric score from within the class atom using Moreno's Sociometric theory. Previous studies have been conducted on school children and young adults but this study was being used as a way to guide praxis for mature master's level students. By identifying students with low social atom scores from their peers the intention was to examine if early intervention could be prescribed based on these results. It was intended as a tool for improving both student outcomes and experiences through better integration within the classroom atom. A null hypothesis was generated that examined the relationship between the Summative mark for the student and the Sociometric acceptance score derived from the test instrument for the student. The hypothesis was examined with Pearson correlation coefficient statistical analysis with a two-tailed non-directional test with the probability, p-level set at <0.05.

7. Method & Procedure

As a conceptual paper the research used two archival data sources including a Sociometric questionnaire used in previous year group classes and Summative module results for the same year group class. The required data was collected using a simple 6 question survey designed with questions based around two variables, academic and social factors. The selection of two variables was used in order to examine the social atoms awareness and preferences within the atom of the individual actors in order to provide a more robust examination of the individual based on these two criteria.

Data from the archival documents was plotted on a network diagram to show linkages and strength of relationships based on the different criteria.

Data from the class Summative assessment was then collated from the marks collection sheets and plotted against the individual students and then a correlation analysis conducted.

The archival data used was from a class of 14 mature full and part-time graduate students studying for a Master's degree in Human Resource Management. The cohort selected was made up of a mixture of part and full-time student from a range of ethnic backgrounds but with a significant proportion of female students within the cohort. Whilst the limited number of male participants may appear significant to the reader it should be noted that the vast majority, 75.8%, of HR professionals in the UK are female, Carty, [24].

8. Results

The results provided a raw score for each individual atom member of the class based on the two categories of

questions posed. A total combined score and a split score was examined through correlation to the atoms Summative result of their coursework using Pearson's correlation coefficient with use of Microsoft Excel software package to complete the calculations. P value was established using Salkind's negative hypothesis table for a two-tailed test with 12 degrees of freedom giving a 0.5324 value for rejection of the null hypothesis, Salkind, [25]. The combined score coefficient exceeded the P value and thus the null hypothesis was rejected with a strong relationship indicated between the two variables. See table 1 below:

Table 1. Social Atom Preference Combined Score Correlation

Correlation Coefficient	0.754532172
p-value <0.05	0.5324
Correlation of Determination	0.569318798

The social atom preference data was then split into the two separate sub-categories, academic and social preferences, and recalculated in order to test for individual differences between them. The results were then tested with an additional correlation of determination test. See combined result table 2 below.

In both instances for academic and social preference the correlation exceeded the p-value thus further supporting the two factor theory conceptualization. The correlation of determination indicated a difference of 57% of the result attributable to social preferences and 40% of the differences to academic with the combined result of again 57%. The difference between social preference and academic preference presented a weak relationship measuring between the 0.2 and 0.4 correlation size.

Presenting the data graphically illustrates the relationship more clearly, see Figure 1 below.

Table 2. Social Atom Preference Academic & Social Preference Score Correlation

	<i>Mark</i>	<i>Social Preference</i>	<i>Academic Preference</i>
Mark	1		
Social Preference	0.752804452	1	
Academic Preference	0.6367532	0.596031579	1
Correlation of Determination			Diff
Mark & Social Preference	0.752804452	0.566714543	57%
Mark & Academic Preference	0.6367532	0.405454638	40%
Social & Academic Preference	0.596031579	0.355253644	35%

Figure 1. Mark Preference Overlap Graph

Low preference scores from within the atom can be seen correlating to low performance marks for the student. The 4 of the 7 students that received the lowest preference scores also went on to perform less favourably in terms of their marks for the coursework. The average number of preferences for the atom was 7.9 but two of the atom actors received no preferences and one received just one whilst the highest scoring atom member received 26 preferences. 8 of the 14 students received preference scores of 7 or lower and from those 7, 4 subsequently did not achieve as highly as was expected.

Examining the data between the two preferences to understand the Effect Size using Cohen's formula to identify the magnitude of the difference between the social and academic preferences presents a medium size effect range at the 0.20 to 0.50 scale, with a measurement Effect Size $r = 0.24$, Cohen, [26].

This moderate overlap of effect indicates again significance of the difference between the two measurements of the group by the two question categories. Reversing the order of the two groups involved to examine the minus effect yields an effect size of $r = 0.026440264731509826$ which is significant between the 0.0 to 0.20 ranges presenting a small effect size. Taken together the effect size is skewed more towards the lower end of the range indicating again a limited effect between

the two categories. See table 3 below.

Testing for additional factors within the atom in order to identify the strength of other factors that could be influential in the atom produced via a t-test for paired sample of means with a 2 tailed test produced a statistically strong significance when the results were paired by ethnicity. See table 4 below for further information. Other socio-demographic data was not available from the atom such as age, income or indeed geographic data. However, this data alone was not considered as part of the study at this stage. The age distribution amongst the atom was evidently wide and not part of the scope of this research and so was viewed as being of limited value in this instance. Further studies may wish to examine this factor as part of future research projects.

The two tailed test produced a t-stat value of 4.126203958 which was considerably larger than the P value ($T \leq t$) two-tail of 0.003315742. The probability of this happening by chance alone is statistically significant and strongly indicates an issue within the atom but inference is assumed or indicated from the data or suggested by the author as to cause. Additional wider research would need to be completed in order to examine the cause of this phenomenon using different samples from a wider population in order to develop a fuller picture.

Table 3. Effect Size

	Standard Deviation			
	Social Preference	Academic Preference		
	6	1		
	3	2		
	5	10		
	8	4		
	3	1		
	8	18		
	0	0		
	4	1		
	7	5		
	6	6		
	3	5		
	0	0		
	1	0		
	0	4		
	54	57		
SD	2.905092157	4.937521735	Cohen's D	-0.504855768
MEAN	3.857142857	4.071428571	Effect size r	-0.244750562

Table 4. t-Test: Two-Sample Assuming Unequal Variances

	White	Ethnic Minority
Mean	13.14285714	2.714285714
Variance	39.47619048	5.238095238
Observations	7	7
Hypothesized Mean Difference	0	
df	8	
t Stat	4.126203958	
P(T<=t) one-tail	0.001657871	
t Critical one-tail	1.859548033	
P(T<=t) two-tail	0.003315742	
t Critical two-tail	2.306004133	

9. Discussion

The results of the analysis indicate a strong relationship between the variables with the social preference indicating a stronger individual relationship than the academic. The Pearson correlation coefficient presents strong statistical relationship for combined and individual preferences. The social relationship on its own varies little from the combined and this is probably due to the fact that Human Resource professionals are people and relationship orientated as opposed to accounting professionals who could be framed as being far more objective driven. However, the result does pose an issue regarding the wish to not offend others and cause group disharmony as a result of the exercise and so the bias of trying to not offend may skew the results. However of the 7 students from the atom that received the lowest preference scores, 4 went on to perform below the standard expected. Testing the data through multiple statistical analyses has resulted in the null hypothesis that *'there is no relationship'* between Sociometric preferences and student achievement being rejected. Indeed, whilst other factors have been mentioned and noted within the paper, the central point of the paper can be viewed to be valid and that there is significance between the two.

Factors such as attendance were not used in the analysis as this was a professionally accredited course that required 80%+ attendance in order to receive the professional recognition of achievement.

Both preference sub-categories illustrated a strong relationship but the relationship between the two subcategories produced a weak correlation which supports the broader theme of achievement and Sociometric status within the atom. One student made 3 selections but received none in return and one other student also received no preference selections and in both cases the students achieved the lowest marks for their work.

Issues such as ethnicity were used to test the data further through a t-Test of the results grouping the atom members by ethnicity. Statistically the probability of the result

occurring by chance alone far outstripped the t-stat generated. The reason for this is unknown and would require additional research which is beyond the scope of this paper. No inference is made but the data does suggest a significance that would need to be factored into any future studies and examined more qualitatively and with great sensitivity as would be expected.

Visual interpretation of the data presented in Figure 1, illustrates a clear delineation between high and low scoring atom members. With 7 of the 14 atom members receiving less than the average number of preferences and of those 7 atom members 4 struggled to achieve. This meant just over 70% of the atom did achieve a good outcome in line with expectations. Academically this was not expected as entry to the course was dependent on both a good first degree qualification and academic reference where required and or a significant amount of professional experience that would enable the student to cope with the academic rigours of the course. However, this still means 30% of the students within the atom did not which is of concern.

Individual marker bias was excluded as a contributing factor due to the coursework being marked by two markers at the point of delivery by the atom members and with further documentary evidence provided for additional individual assessment by each marker before marks were confirmed and sent to the external examiner for examination and approval. In addition to this the external examiner was also present during the presentation of the coursework and able to view both student and faculty before reviewing the sample work sent to them with marks and feedback from the markers.

The research presents a snapshot of one group of students in a forced environment where pressure to succeed is both internally and externally motivated. As far as possible given the limitation of the archival data the research does show significance for the results to be valid and open top further testing.

10. Implications for Praxis

The implications for the lecturer/practitioner, the student, the university and the sponsoring organization are significant. The lecturer/practitioner must be aware of the desire of the individual student to succeed but also needs to provide opportunity for integration into the atom whilst maintaining academic standards and rigour. For the student the opportunity to learn, not only from the course and lecturing team, is paramount to their purpose of enrolment and future career aspirations. The university needs success at the individual student level in order to continue to provide the course and secure both monies and institutional reputation within the market space. Any sponsoring organization is making a financial investment and strong psychological commitment to the individual student/employee and their wish to reap the benefits of their sponsorship is a commercial pressure.

Lecturers' therefore need to be aware of any Sociometric tensions within the social atom in order to monitor the strength of acceptance and rejection and any negative implications. Not all social isolates are prone to a lack of success in a social atom. Some are happy and confident to succeed without additional relationship bonds growing within the atom but it is the issue of identifying which is which that becomes critical to the process. Whilst predictive measures can be taken at the point of a mock test such as at secondary school level the post graduate market expects a certain level of independent study from the student which is entirely correct. However, with the market forces moving to readdress the relationship between university and student towards a more transactional relationship with consumer rights protection can the university leave the student to succeed or fail without further concern? Screening applicants prior to enrolment and testing for previous academic achievement works, but not entirely. Asking students to form work groups and share knowledge and experience again works, but then again not always. Asking students to complete Sociometric preference activities to map their position within the social atom does allow lecturers to take preventative action before the student starts to fail at the Summative assessment stage, whether or not that preventative action is successful remains to be seen through further research.

11. Limitations and Implications for Future Research

This research used archival data to examine the topic and produced a result that confirmed the researcher's concept. The data does have some issues that would need to be examined through further research such as using both larger and different sample of populations. A small class of professional post graduate students from middle England located in the affluent South East of the country does offer plenty of scope for further testing from different locals. Equally, any future study would be best suited to a longitudinal examination of performance for a stable sample drawn from the same population using a set of courses and practitioners where variables could be monitored and limited in order to address potential bias and variable disruptors. This study presented the data it had access to and not additional data to examine additional issues as mentioned earlier such as age, socio-economic status or indeed geographic location factors. Ethnicity was an issue that demonstrated some areas for further research. Accordingly any future research should be designed to factor issues such as these into the analysis in order to further explore cause and effect with a more robust set of data to use in order to isolate and test the hypothesis further. By chance and not design the research did use to variables to assess the atom relationships and these provided enough data for the analysis but a more robust Sociometric

research tool should be developed and applied in order to provide further insight.

In conclusion, Sociometric mapping has been largely ignored by main stream academic and professional practitioners but the value is there to be used. Whilst technology has enabled the topic to re-emerge into the consciousness of society somewhat, the application, purpose and meaning of Sociometry is starting a new chapter as the importance of relationships and success becomes more evident to us despite the rise of the machines. Success is often, sadly, defined as salary and job title but, success is also achieving and not failing and lecturers and universities whether they like it or not need every tool available to provide this otherwise they will soon find the consumer votes with their feet.

REFERENCE

- [1] Moreno, J. L. (1953). *Sociometry: A Journal of Interpersonal Relations and Experimental Design* 18 (4).
- [2] Hale, A. E. (1981). *Conducting Clinical Sociometric Explorations: A Manual for Psychodramatists and Sociometrists*. Roanoke, VA: Royal.
- [3] Alshamsi, A., Pianesi, F., Lepri, B., Pentland, A., and Rahwan, I. (2016). Network Diversity and Affect Dynamics: The role of personality traits. *PLoS ONE*. 11 (4). E0152358. doi:10.1371
- [4] Myers, K.C., and Briggs-Myers, I. (2000). *Introduction to type*. 6th ed. Consulting Psychologist Press.
- [5] Belbin, M. (1993). *Team roles at work*. Butterworth-Heinemann.
- [6] Rubin, K. H., Bukowski, W. J., & Parker, J. G. (1998). Peer interactions, relationships, and groups. In W. Damon & N. Eisenberg (Eds.), *Handbook of child psychology* (Vol. 3, 5th ed., pp. 619–700). New York, NY: Wiley.
- [7] Moreno, J. L. [1953] 1993. *Who Shall Survive? Foundations of Sociometry, Group Psychotherapy, and Sociodrama*. Student ed. Roanoke, VA: Royal.
- [8] Moreno, J. L. (1951). *Sociometry, Experimental Method, and the Science of Society*. Ambler, PA: Beacon House.
- [9] Corley, K. G., & Gioia, D. A. (2011). Building theory about theory building: What constitutes a theoretical contribution? *Academy of Management Review*, 36, pp. 12-32.
- [10] Bronfenbrenner, U. (1979). *The Ecology of Human Development*. Cambridge MA. Harvard University Press.
- [11] Hollander, C.E. and Hollander, S.L. (1974). *Action Relationships in Learning*. Denver CO. Snow Lion Press.
- [12] Hollander, S.L. (1978). *Social Atom: An alternative to imprisonment*. Denver CO. Snow Lion Press.
- [13] Remer, R. (1995). Strong Sociometry: A Definition. *Journal of Group Psychotherapy, Psychodrama and Sociometry*. 48. pp.69-74.

- [14] Martin, E. (2011). The Influence of Diverse Interaction Contexts on Students' Sociometric Status. *The Spanish Journal of Psychology*. 14 (1), pp. 88-98.
- [15] Goodacre, D. M. (1951). The Use of a Sociometric Test as a Predictor of Combat Unit Effectiveness. *Sociometry* 14: pp. 148-152.
- [16] Burks, V.S., Dodge, K.A., and Price, J.M. (1995). Models of internalizing outcomes of early rejection. *Developmental Processes in Peer Relations and Psychopathology*. 4, (7), pp. 683-695.
- [17] Remer, R. (2000). The Evolution of Sociometric Theory From a Chaos Perspective. *Action Methods*. Spring 2000, pp.17-32.
- [18] Paretti, P.O. and McNair, A. (2001). Self-Perceived Psychological and Social Characteristics of the Sociometric Isolate. *Education*. Spring 87, 107, (3), pp. 310-315.
- [19] Lorber, N.M. (1966). Inadequate Social Acceptance and Disruptive Classroom Behaviour. *Journal of Educational Research*. 59. pp.360-362.
- [20] Davis, K. (1947). A final note on a case of extreme isolation. *American Journal of Sociology*. 52, pp.432-437.
- [21] Lott, A.J. and Lott, B.E. (1966). Some Indirect Measures of Interpersonal Attraction among Children. *Journal of Educational Research*. 59. pp.363-371.
- [22] Paretti, P.O. (1975). Perceived Personality Impressions in Student Acceptance and Rejection Interaction Patterns in the Classroom. *Research Quarterly*. 46. pp.457-462.
- [23] Farmer, W.A., Hall, C.M., Leung, M.C., Estell, D.B., and Brooks, D. (2011). Social prominence in the Heterogeneity of Rejected Status in Late Elementary School. *School Psychology Quarterly*. 26, (4), pp.260-274.
- [24] Carty, M. (2011). The UK HR profession 75.8% female. XpertHR. [Online]. URL available at: <http://www.xperthr.co.uk/blogs/employment-intelligence/2011/04/the-uk-hr-profession-is-758-fe/> (20 March 2017).
- [25] Salkind, N.J. (2010). *Statistics for People Who Think They Hate Statistics*. London. Sage Publications.
- [26] Cohen, J. (1988). *Statistical Power Analysis for Behavioural Sciences*. NJ: Lawrence Erlbaum Associates.