

The Effect of Gender on Transactive Dialogues In Peer Collaboration

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Abstract: *This Study Examined The Effect Of Gender On Transactive Dialogues Produced By 18 Children In 3 Groups – A Group Of 6 Boys, A Group Of 6 Girls And A Mixed Group Of 3 Boys And 3 Girls – In Collaborative Learning During A Science Lesson In A Fourth Grade Of A Governmental Primary School In A Mainstream Area Of Cyprus. A Coding Scheme Was Used For Quantifying The Transactive Dialogues Between The Participants. The Analysis Of The Data Revealed That The Transactive Dialogues In Peer Collaboration Attributed To The Girls' Group Were More Than The Transactive Dialogues Attributed To The Boys' Group, In Contrast To The Mixed-Gender Group Where Boys Produced More Transactive Dialogues Than Girls Even If In The Mixed-Gender Group Were Produced Totally The Most Transactive Dialogues In Relation To The Three Groups. However, It Cannot Be Established How Far And In What Way The Gender Affects Transactive Dialogues In Peer Collaboration In A Science Lesson Because A Number Of Other Theoretical And Methodological Factors That Were Not Set Out To Control In This Study Might Have Affected The Results.*

Keywords: *Transactive Dialogues, Gender, Peer Collaboration, Primary School Children*

I. Introduction

Collaboration Is The Process Of Converging On Shared Understandings Of Meaning, Ideas, And Experience Among Discussants [16]. Peer Collaboration Is A Very Special Form Of Communication That Occurs Between Partners [14]. Very Often This Special Type Of Communication Is Found Operating In The Classroom As Students Collaborate In A Reciprocal And Interdependent Manner [9]. The Possible Benefits Of Collaborative Learning Have Been The Issue Of Academic Discussion For Many Centuries [1, 8].

It Has Been Argued That The Peer Collaborative Process Fostered Cognitive Change [15]. Collaborative Learning Has Gained Acceptance In Elementary, As Well As Secondary Classrooms As An Instructional Design For Increasing Learning Benefits, And Developing Complex Problem-Solving [16]. It Has Also Been Found To Have A Positive Impact On Many Variables Other Than Achievement Such As: Prosocial Behaviour, Positive Attitudes Towards Class And School, Inter-Racial Acceptance, Increased Self-Esteem And A Way To Manage Academic Heterogeneity In Classrooms, With A Wide Range Of Achievement In Basic Skills [21].

However, Researchers Claim That It Is Not Sufficient To Set Groups Of Children Collaborative Tasks And Hope That They Will Work Productively [16, 18]. Besides, Any Group Work Should Not Be Established As A Kind Of Educational Remedy. According To [11], It Depends Whether Group Work Leads To Better Cognitive Outcomes Or Not. The Research On This Topic Has Investigated Different Aspects Of Collaborative Learning, The Aspect Of Gender And How That Affects Collaborative Learning Needs Further Studying, And That There Is Limited Information For Generalization Purposes [19, 12].

Accordingly, [22] Has Shown How The Different Interactive Styles Of Boys And Girls Can Influence The Construction Of Knowledge, Thus Affecting The Quality Of Learning. Although There Are A Lot Of Differences Amongst Boys And Girls, Male Students Of Different Ages Tend To Dominate The Discussions, To Make More Directive And Indirective Comments To Their Partners, And To Adopt More Vital Roles In Joint Problem-Solving [22]. In Terms Of Gender, Collaborative Situations Promote A Process Of Acceptance That Results In Equal Status For Male And Female Group Members. Furthermore, The Single-Gender Collaborative Groups Have Been Shown To Work To The Advantage Of Many Female Students. Collaborative Learning Strategies Can Enhance Girls' Learning Outcomes, More So Among The Groups That Are Single-Gender, Than Among Mixed Gender Groups [15].

Moreover, The Study By [20] Who Examined Peer Collaboration In The Form Of Friendship And Gender, Sought To Establish Association Between Gender, Friendship, And The Interpretation Of Tasks And Social Problems. They Revealed That Eighth Grade Adolescents Who Were Studied Over A Period Of 6 Weeks During A Spanish Project Chose To Work With The Same Gender And With Their Friends. The Limitations Of This Study Included That The Students In The Group Were Self-Selected And Were Selected From The Same Classroom. Following This, The Self-Selected Groups Probably Do Not Demonstrate The Reality Of The Problem In Terms Of Frequency, Type And Severity.

Significantly, [1] Paid Special Attention On The Effects Of Collaborative Learning On The Negotiation Processes, On The Task Difficulty, On Gender, On Same Ability Or Mixed-Ability Pairs And Groups, And The Relationship Between The Collaborators. Emphasis Was Given To The Kind Of Talk That Leads To Cognitive Advances In Children's Thinking; The Notion Of Transactive Dialogues Was Used. Transactive Discussion Has Been Shown To Be Associated With, If Not A Part Of The Process Of Peer Collaboration [1]. Transactive Dialogues Were Defined "As One Individual Operates On The Reasoning Of The Partner Or That Significantly Clarifies His Or Her Own Ideas" [10]. It Is A Form Of Discourse That Often Leads To Cognitive Change As A Result Of The Interaction Between Group Participants As They Wrestle With Their Different Perspectives In Order To Achieve A Common Understanding [10]. Transactive Discussion Is A Form Of Negotiation Between Group Members As They Interpret The Meaning Of Their Logical Statements About A Topic [8]. Moreover, Researchers Noted That Discussants "Transact" When They Participate In Transactive Discussions That Engage A Partner's Reasoning [13]. Importantly, Research Has Shown That Transactive Discussion Contributes To Improvement Of Outcome Performance In Scientific Reasoning [2].

Research On Collaborative Learning In Terms Of Transactive Dialogues In Primary School Children In Cyprus- Where This Study Took Place-, Has Been Barely Touched. Suffice It To Say That To Date The Transactive Dialogues In Peer Collaboration Of Primary School Children In Cyprus Has Not Been Well Studied. The Basic Aim Of This Study Was To Contribute As Much As Possible To The Knowledge About Collaborative Learning In Terms Of Transactive Dialogues In Primary School Children In Cyprus. More Specific, This Study Aimed To Identify Whether The Gender Affects The Transactive Dialogues In Peer Collaboration During A Science Lesson Within A Group Of Girls, A Group Of Boys And A Mixed Gender Group Of Primary School Children In Cyprus.

II. Methodology

Design

The Hypothesis Of This Small-Scale Study Stated That The Gender Of The Pupils Influences The Transactive Dialogues In Peer Collaboration In Girls' Group, Boys' Group Or Mixed-Gender Group In A Science Lesson. A Coding Scheme Was Used To Quantify The Transactive Dialogues During Peer Collaboration In The Groups Of The Participants. They Were Matched In Groups Based On Their Gender. Other Factors Such As Age, Ability, Task Familiarity Etc Were Not Considered. The "Between Participants Design" Approach Was Opted For The Study Where Different Pupils Participate In Each Group. According To The Hypothesis Of This Study It Would Not Be Edifying To Opt The "Within Participants Design" Approach And Have The Same Pupils Participate In Each Group.

Participants

The Sample Of This Study Included 18 Children Aged 9-10 Years Old, Taken From The Fourth Grade Of A Governmental Primary School In A Mainstream Area In Cyprus. Consent For The Participation Of The Children Was Obtained From The Principal Of The School And The Parents Of The Children. The Subjects Were Actually 9 Boys And 9 Girls. They Were Formed In 3 Groups – A Group Of 6 Boys, A Group Of 6 Girls And A Mixed Group Of 3 Boys And 3 Girls. Subjects Were Randomly Chosen To Form These Groups. The Participants Were Recruited And Allocated To Their Roles In The Study Based On The Guidelines Of The Science Teacher Of The Fourth Grade. Any Relationships And Friendships Between The Pupils Were Of No Concern.

Materials

The Task Given To The Participants Was Focused On The World Of Forces And Specifically On The Effect Of Forces On Objects. A Colorful Picture Showing A Mixed Group Of Pupils Exploring What Can Force Do On Cars Was Chosen From The Teacher Of The Science Lesson In Order To Set Off Participants' Collaboration And Help Them To Make A List Of Powers' Affections On Objects. The Teacher Of Science Lesson Withdrew Her Teaching Resources From The Governmental Textbook For Science And She Insisted On Not Using Other Material For The Groups Except From The Particular Picture. The Teacher Of Science Lesson Did Not Want To Make Any Special Arrangements For The Particular Session. After Her Introduction For The Lesson, She Gave To The Participants Verbal Instructions For Carrying Out The Task And Let Them Know That Their Dialogues Were Recorded And The Data Would Be Used For This Study. The Pupils Were Completely Informed About The Techniques To Be Used. Furthermore, The Teacher Of The Science Lesson Ensured Pupils For Their Anonymity And That The Tape Would Be Erased At The End Of The Transcription. Everybody Was Informed That He/She Had The Right To Withdraw.

Afterwards She Asked From Them To Use The Chosen Picture, Discuss And Co-Operate In Order To Make A List Of Forces' Affections On Objects. The Available Time Was 15 Minutes. Three Small Unobtrusive

Audio Recorders Were Used For Recording The Fifteen Minutes Of The Dialogues Of Each Group Separately. Audio Recorders Were Put To The Groups' Tables; When The Time Limit Expired, They Were Collected.

Development Of Coding Scheme

A Coding Scheme Was Developed Based Mainly On Kruger's [10] Approach For Identifying Transactive Dialogues Between Participants Through The Counting Of Three Main Features –Transactive Statements, Transactive Questions And Transactive Responses. Transactive Statements Were Defined As “Spontaneously Produced Critiques, Refinements, Extensions, Or Significant Paraphrases Of Ideas”, Transactive Questions Were Defined As “Spontaneously Produced Requests For Clarification, Justification Or Elaboration” And Transactive Responses Were Defined As “Clarifications, Justifications Or Elaborations Of Ideas Given In Answer To A Transactive Question” [10].

The Original Coding System Of Kruger [10] Allows Identification Also For Individual Differences In Each Child's Contribution That Was Not Part Of The Aims Of This Study. Thus For The Purpose Of This Study, Appropriate Amendments Were Made And The Kind Of Information That Was Collected With The Use Of The Coding Scheme Was In The Form Of Ticks For The Three Features Of Transactive Dialogues In The Two Same Gender Groups And In B-For Boys, G – For Girls For The Mixed Group. Lastly, The Chart Was The Record Of The Total Number Of Transacts Attributed To Participants In Each Group And In The Mixed Group It Was Also The Record Of The Total Number Of Boys' Transacts And Girls' Transacts Separately. The Proforma Enabled A Comparison Of Pupils' Transactive Dialogues In Each Group.

2.5. Analysis

Once The Data Were Collected, A Table Was Prepared Which Contained The Raw Data. Descriptive Statistics Such As Frequencies, Percentages And Averages Were Used For Summarizing The Data. Data Were Presented In Tables, Bar Charts And Pie Charts. Further Discussion Was Done For Interpreting The Quantitative Data And Addressing The Study's Hypothesis And Research Question. Limitations In Research Procedure Were Also Considered.

III. Results

For This Small-Scale Study, A Coding Scheme Was Used To Quantify The Transactive Dialogues Produced By 3 Groups – A Group Of 6 Boys, A Group Of 6 Girls And A Mixed Group Of 3 Boys And 3 Girls During Peer Collaboration In A Science Session. The Coding Scheme For Identifying Transactive Dialogues Between Participants Contained Three Features –Transactive Statements, Transactive Questions And Transactive Responses.

Once The Data Were Quantified Table 1 Was Prepared. Firstly, The Total Number Of Transacts In Transactive Dialogues Of Each Group Was Added Up. Thus, The Frequency Of Transacts In Each Group Per Fifteen Minute Period Was Revealed. The Frequency Of Transacts In Transactive Dialogues In The Mixed-Gender Group Was Higher Than The Other Two Groups. Obviously The Mixed-Gender Group Was The Most Marked Feature.

Table 1. The Frequency Of Transacts In Boys' Group, Girls' Group And Mixed Group

	Boys' Group	Girls' Group	Mixed Group
Transactive Statements	10	15	19
Transactive Questions	5	6	7
Transactive Responses	3	6	5
Totals	18	27	31

Next, The Total Number Of Transacts In Transactive Dialogues Of Each Group Was Added Up And Worked Out What These Were As A Percentage Of The Total Number Of Transacts. For The Boys' Group This Came Up To Be 24%, For The Girls' Group It Came To 35% And For The Mixed-Gender Group Was 41%. The Percentage Of Transacts Achieved By Girls' Group Was Higher Than This Of Boys' Group And The Mixed Group Achieved The Highest Percentage Of Transacts In Transactive Dialogues.

To Confirm This, The Average Of Transacts In Transactive Dialogues Was Worked Out. The Total Number Of Transacts (76) Was Divided To The Total Number Of Groups (3). This Came Up By 25 Transacts Per Group. The Girls' Group Was Quite Close To The Average Number And The Mixed-Gender Group Was Above The Average In Contrast To Boys' Group Which Was Lower Than The Average Number.

For The Data Analysis, It Was Also Searched If The Patterns Of Transacts In Transactive Dialogues Were Different Depending On Boys In General And In Girls In General And Not In Each Group. The Total Transacts Attributed To Boys Were Added Up As Shown In Table 2 And The Total Transacts Attributed To Girls Were Added Up As Shown In Table 3.

The Percentage Of Total Transacts Of Boys And Total Transacts Of Girls Was Looked At As Well. Figure 1 Shows Again That The Pattern Was Quite Clear. The Percentage Of Total Transacts In Transactive Dialogues Of Girls Was Higher Than This Of Boys. Of Course It Was Impossible To Draw Firm Conclusions On The Basis Of Only A Single Observation Of One Lesson And A Group Of 18 Participants.

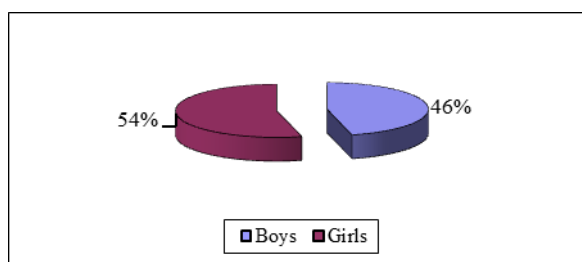
Table 2. The Total Transacts Attributed To Boys

<u>Transacts Of Boys</u>	
Boys' Group	18
Mixed Group	17
Total	35

Table 3. The Total Transacts Attributed To Girls

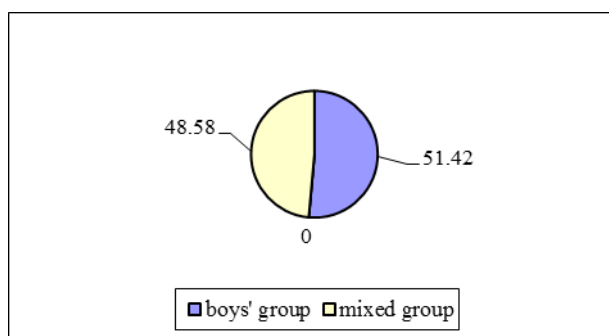
<u>Transacts Of Girls</u>	
Girls' Group	27
Mixed Group	14
Total	41

Figure 1. The Percentage Of Total Transacts Of Boys And Total Transacts Of Girls



Further Analysis Of The Data Was Conducted. The Transacts In Transactive Dialogues Attributed To Boys In Boys' Group (18) And Mixed-Gender Group (17) Were Worked Out In What These Were As A Total Number Of Transacts In Transactive Dialogues (35) Attributed To Boys. For The Mixed-Gender Group This Came To 49% And For The Boys' Group It Came To 51%. Figure 2 Shows That The Number Of Boys' Transacts Achieved By Mixed-Gender Group And By Boys' Group As A Percentage Of The Total Number Of Transacts Attributed To Boys Were Quite Close.

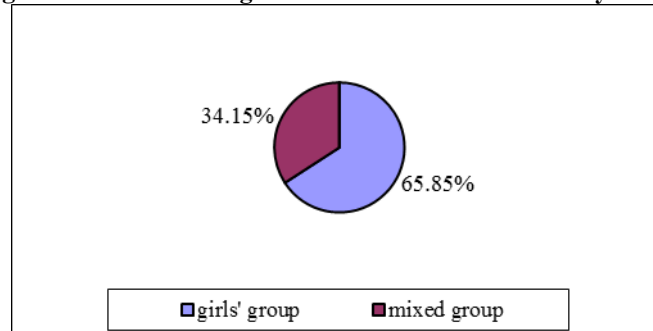
Figure 2. The Percentage Of Boys' Total Transacts By Group



Moreover, The Transacts In Transactive Dialogues Attributed To Girls In Girls' Group (27) And Mixed-Gender Group (14) Were Worked Out In What These Were As A Total Number Of Transacts In Transactive Dialogues (41) Attributed To Girls. For The Mixed-Gender Group This Came To 34% And For The Girls' Group It Was 66%. Figure 3 Shows That The Number Of Girls' Transacts Achieved By Mixed-Gender Group And By Female Group As A Percentage Of The Total Number Of Transacts Attributed To Girls, Are Different. This Was An Interesting Finding. On The Face Of It The Girls In Mixed-Gender Group

Achieved Approximately Half The Percentage Of Transacts In Relation To The Number Achieved By The Girls In Female Group As A Percentage Of The Total Number Of Transacts Attributed To Girls.

Figure 3. The Percentages Of Girls' Total Transacts By Group



IV. Discussion

The Focus Of This Study Was On The Effect Of Gender On Transactive Dialogues In Peer Collaboration During A Science Lesson. The Hypothesis For This Small-Scale Study Stated That The Gender Of The Pupils Influences The Transactive Dialogues In Peer Collaboration In A Same Gender Or Mixed-Gender Groups In A Science Lesson. The Results Showed That The Transactive Dialogues In Peer Collaboration Attributed To A Girls' Group Are More Than The Transactive Dialogues Attributed To A Boys' Group. In Addition To That, While Gender Has Not Emerged As A Prominent Issue In The Girls' Group And In The Boys' Group, It Was Figured Out More Prominently In Transactive Dialogues In The Peer Collaboration Of The Mixed-Gender Group. More Precisely, In The Mixed Group Boys Produced More Transactive Dialogues Than Girls.

However It Should Be Highlighted That This Result Was Partly Expected In Accordance To Literature And It Is Actually Highly Supported By The Literature On Boy Dominance In Mixed-Gender Collaboration [17]. Not Surprisingly The Results Of The Mixed-Gender Group Of This Study Are Supported By The Literature On Boys' Superiority On Science Lesson And Girls' Lack Of Confidence In Cases Of Collaboration [6].

But On The Contrast, The Results Of Girls' Same-Gender Group And Boys' Same-Gender Group Revealed That Girls' Performance In Transactive Dialogues In Peer Collaboration When They Are In "Isolation" And Not In A Mixed-Gender Group Is Higher Than This Of Boys. From Vygotskian Perspective In An Interaction Apart From A Specific Aim, A Number Of Other Factors Concerning The Negotiation Of The Relative Status Of The Partners Will Necessarily Be Involved [23]. For Example The Way Responsibility Is Shared May Affect Results In Peer Collaboration [1]. Similarly, Light And Littleton [11] Argued That Analysis Of Cognitive Process In Peer Interaction Couldn't Be Pursued Very Far In Isolation From The Social, Motivational And Emotional Dimensions Of Such Interaction. In This Study The Performance In Transactive Dialogues In The Boys' Group Probably Due To The Lack Of Motivation And Competition Was Lower Than This Of Boys' Participated In The Mixed-Gender Group [11].

Moreover, Pupils' Performance In Peer Collaboration Depends On Their Skill Level, Relative To The Difficulty Of The Task [1]. Unfortunately In This Study, Neither The Skill Level In Transactive Dialogues For Participants In The Mixed-Gender Group Nor The Skill Level In Transactive Dialogues For Participants In The Other Two Groups Was Known Or Counted Earlier. Obviously, The Fact That In A Science Lesson The Gender Of The Pupils Influences The Transactive Dialogues In Peer Collaboration In A Same Gender Or Mixed-Gender Groups Is Not The Only Issue. Besides, It Is A Well-Known Fact That The Characteristics Of The Task Or The Setting [5] The Nature Of The Relationship Between Collaborators [1, 4] And Collaborative Skills Of Participants [7] Affect The Performance In Collaborative Learning As Well. Finally, As Brownell And Carriger [3] Pointed Out We Have Still No Real Understanding Of How Individual Differences Between Children Affect The Nature Of Their Relationships And Their Learning.

These Factors Were Not Set Out To Control In This Study When The Transactive Dialogues In Peer Collaboration Were Measured. Consequently It Is Impossible To Be Confident About The Results Found Concerning The Association Between Gender And Transactive Dialogues In Peer Collaboration. It Cannot Be Established For Definite How Far And In What Way The Gender Affects Transactive Dialogues In Peer Collaboration.

As It Was Foreseen At The Outset, Although The Results Of This Study Revealed That Transactive Dialogues In Peer Collaboration Attributed To A Girls' Group Are More Than The Transactive Dialogues

Attributed To A Boys' Group In Contrast To The Mixed-Gender Group Where Boys Produced More Transactive Dialogues Than Girls Even If In The Mixed-Gender Group More Transactive Dialogues Were Produced, It Cannot Be Assumed That Gender Is The Whole Story. It Is Clear From The Study Findings That There Is A Need For Further Research To Take Into Consideration Other Variables Such As Different Age Ranges, Friendship And Academic Ability For Generalization Purposes. Future Research Needs To Focus On A More Diverse Group Of Participants. Group With More Participants Needs To Be Studied Over A Longer Period Of Time For More Accurate Results. Under The Scope Of A Further Research, Structured Observation Accompanied By Another Method Could Have Been Of The Greatest Utility In Areas Of Education That Might Emerge.

V. Conclusion

Although The Data From The Present Study May Not Be Exhaustive, The Results Are Important In At Least Two Major Respects. This Study Provides, For The First Time, Valuable Information On The Effect Of Gender On Transactive Dialogues Of Primary Students In Cyprus In Peer Collaboration. The Value Of This Study Lies Also In The Exploration Of An Under-Researched Area Of Practice In School Settings In Cyprus. The Ultimate Outcome Of This Study Should Be A Step Towards Enabling Practitioners To Improve Their Knowledge And Understanding Of Peer Collaboration And Transactive Discourse. However, The Current Study Was Not Specifically Designed To Evaluate All Factors Related To The Production Of Transactive Dialogues Of Primary School Children In Cyprus In Peer Collaboration. Many Challenges Remain For Understanding Enough About Collaboration Processes And Outcomes.

References

- [1] Azmitia, M. (1997) "Peer Interactive Minds" In Faulker, D., Littleton, K. And Woodhead, M., *Learning Relationships In The Classroom*, London, Rutledge/The Open University.
- [2] Azmitia, M. And Montgomery, R. (1993) Friendship, Transactive Dialogues, And The Development Of Scientific Meaning, *Social Development*, 2(3), Pp. 202-221.
- [3] Brownell, C. A. And Carriger, M. S. (1991) "Collaborations Among Toddler Peers", In Woodhead, M., Faulkner, D. And Littleton, K., *Cultural Worlds Of Early Childhood*, London, Rutledge/The Open University.
- [4] Brownell C.A., Ramani G.B. And Zerwas S. (2006) Becoming A Social Partner With Peers: Cooperation And Social Understanding In One- And Two-Year-Olds. *Child Development*, 77(4), Pp. 803–821.
- [5] Ellis, S. And Rogoff, B. (1986) "Problem Solving In Children's Management Of Instruction" In Mueller, E. C. And Cooper, C. R. (Eds) *Process And Outcome In Peer Relationships*, Pp.301-325, New York: Academic Press.
- [6] Harding, J. (1996), "Girls Achievement In Science And Technology-Implications For Pedagogy", *Equity In The Classroom*, London, Falmer Press, Unesco.
- [7] Hinde, R. A. (1979) *Towards Understanding Relationships*, New York: Academic Press.
- [8] Jurkowski, S. And Hänze, M. (2015) How To Increase The Benefits Of Cooperation: Effects Of Training In Transactive Communication On Cooperative Learning. *British Journal Of Educational Psychology*, 85(3), DOI: 10.1111/Bjep.12077
- [9] King, A. (1998) Transactive Peer Tutoring: Distributing Cognition And Metacognition. *Educational Psychology Review*, 10(1), 57-74.
- [10] Kruger, A. C. (1992) 'The Effect Of Peer And Child-Transactive Discussions On Moral Reasoning', *Merrill-Palmer Quarterly*, 38, Pp. 191-211.
- [11] Light, P. And Littleton, K. (1994) "Cognitive Approaches To Group Work" In Faulkner, D., Littleton, K. And Woodhead, M., *Learning Relationships In The Classroom*, London, Rutledge/The Open University.
- [12] Ling C., Ruta, D., Powell, L. And Ng, J., (2014) Does Gender Matter For Collaborative Learning?, In *Teaching, Assessment And Learning (TALE)*, 2014 International Conference On , Pp.433-440, 8-10 Doi: 10.1109/TALE.2014.7062581
- [13] Martin, C. L. And Fabes, R. (2001) 'The Stability And Consequences Of Young Children's Same-Sex Peer Interactions', *Developmental Psychology*, 37(3), Pp. 431-446.
- [14] Pellegrini A.D. (2009) *The Role Of Play In Human Development*. New York: Oxford University Press.
- [15] Ramani, G. B. And Brownell, C.A. (2014) Preschoolers' Cooperative Problem Solving: Integrating Play And Problem Solving, *Journal Of Early Childhood Research*, Vol. 12(1) 92–108 DOI:0.1177/1476718X13498337
- [16] Rubin K.H., Bukowski W. And Parker J. (2006) Peer Interactions, Relationships, And Groups. In: Damon W (Series Ed.), Eisenberg N (Vol. Ed.) *Handbook Of Child Psychology: Social, Emotional, And Personality Development*, Vol. 3, 6th Ed. Hoboken, NJ: Wiley, Pp. 571–645.
- [17] Siann, G., Durndell, A., Macleod, H. And Glissov, P. (1988) "Stereotyping In Relation To Gender Gap In Participation In Computing", *Educational Research*, 30, Pp. 98-103.
- [18] Short-Meyerson K.J. (2010) Preschoolers' Establishment Of Mutual Knowledge During Scripted Interactions, *First Language*, 30, Pp. 219–236.
- [19] Stepulevage L. (2001), "Gender/Technology Relations: Complicating The Gender Binary", *Gender And Education*, 13 (3), Pp.325-338.
- [20] Strough, J., Berg, C. A. And Meegan, S. P. (2001) 'Friendship And Gender Differences In Task And Social Interpretation Of Peer Collaborative Problem Solving', *Social Development*, 10(1), Pp.1-22.
- [21] Tolmie, A. K., Topping, K. J., Christie, D., Donaldson, C., Howe, C., Jessiman, E. And Thurston, A. (2010) Social Effects Of Collaborative Learning In Primary Schools, *Learning And Instruction*, 20(3), Pp.177-191
- [22] Underwood J., Underwood G. & Wood D. (2001) When Does Gender Matter? Interactions During Computer-Based Problem Solving. *Learning And Instruction*, 10, Pp. 447–462.
- [23] Vygotsky, L. S., (1978) *Mind In Society: The Development Of Higher Psychological Processes*, Cambridge, Mass., Harvard University Press