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SINGLE-SEX SCHOOLS ARE EFFECTIVE FOR GIRLS' ACADEMIC ACHIEVEMENTS. HAVE WE GOT THE RIGHT END OF THE STICK?

Аннотация. С приближением возраста детей к школе, родители начинают серьезно задумываться о выборе среднего учебного заведения. Можно слышать много различных возражений по поводу раздельного обучения детей. Например, то, что мальчики не научатся взаимодействовать с девочками, тем самым не обретут навыка, необходимого для будущего любого общества. Так ли это на самом деле и каковы основные плюсы и минусы будут рассмотрены в данной статье, целью которого является критический анализ влияния раздельного обучения на успеваемость студентов как мальчиков так и девочек.

Ключевые слова: раздельное обучение, перспективы, успеваемость студентов, методы.

The separation of gender in educational environment has been practiced for a long period of time in many nations worldwide. Single-sex schooling can be described as the separation of male and female students within their own sex in educational environment [1]. There has been a substantial amount of debates around the question of whether academic involvement is fostered or not in single-sex classrooms [2; 3; 4;]. However the question of single-sex schooling is still contested and this report will consider the studies which have been conducted with the aim to understand the nature of 'single-sex schooling', its effectiveness on students' academic achievements, the role of peer quality, social along with educational environment. Gender composition in classroom environment, for the purpose of this report, is taken to refer to overall learning atmosphere with different factors having impact on it.

The choice of the articles is based on several reasons. Firstly, all of the three empirical research articles are from peer reviewed journals, secondly, the examination of each of the article allows comparing different methodological approaches and the results they led to in current researching area, finally the choice is justified due to robustness and complexity of the implemented methodology.

The essay will shortly delineate the overlapping formulation and significance of research questions and hypotheses in each empirical research studies. After that, the application of data collection will be evaluated, together with sampling, used instruments, primarily used design, procedures as well as techniques employed for data analysis. Finally,

the conclusion will be drawn in accordance with the findings of the research studies together with the implications for the further research on the effectiveness of single-sex schooling. Due to the fact that the exploration of single-sex schooling does not require experimental intervention referenced scholarly articles in this essay will be critically evaluated presenting nuanced critique of used methodology.

Research questions and hypotheses

That before formulating the hypothesis for the study it is important for the author to clearly state theoretical orientation the researchers presented an extensive overview of the existing literature [5].

Couinard et al. [6] , Hayes et al. [7] in their studies do not explicitly state a research question they rather emphasize and set ‘the objectives of their research’ in order to examine the impact of the environmental setting on girls’ academic achievement (single-sex or co-educational). However, according to Robson [8] the presentation of several short coherent questions could help to avoid inconsistency of the research objective and state it more clearly. By this it can be inferred that Couinard et al. [6] and Hayes et. al [7] appear to adopt the alternative way of operationalizing the research question by setting a ‘non-directional hypothesis’ instead i.e. authors predict that there is a difference between girls’ attainment in gender segregated and non-segregated classroom [9]. Furthermore, Hayes et al. attempted to identify whether the peer academic performance can influence on students’ overall outcomes.

Jackson [10]. on the contrary, states his research question directly of whether single-sex classrooms enhance students’ learning experience or not. This can be accounted to the strengths that in the early stages of the research stating research questions explicitly is important since they potentially guide the research process and direct the main data collection [8].Cohen et al. [9] state that it is essential for the conducted research not only to be original, non-trivial, and engaging in its essence but it should also make a substantial contribution to the area being researched. Bearing this in mind the authors seem to identify ‘the gap’ and emphasize the potential contribution their research studies can make in existing debate.

Methodological strengths and weaknesses

Sampling

Concerning the effect of the sample size on the reliability in quantitative research the larger the sample the more generalizable results are [9]. Therefore due to the extended sample sizes Couinard et al. [6] Hayes et al. [7] ensured the external validity of their findings.

Although Couinard et al. [6] in their study do not indicate their sampling techniques, it can be inferred that the sample was *purposive* as they analysed students from single-sex and coeducational schools [11]. According to Cohen et al. [9] *purposive sampling* can be the best option in some cases when researcher intends to make a focus on specific features of a particular group of variables. The study carried out by Couinard et al. [6] employed 340 high school girls who were separated into two cohorts from 7th to 9th grade and from 9th to 11th grade respectively (Canada, French speaking population inMontreal). Sampling seems problematic since some proportions are left unexplained: the participants were from eight mixed and two single-sex schools, further, they were examined under the subject areas, either in mathematics or language arts. Since the authors do not justify the proportions external validity may be questioned i.e. the extent to which two single-sex schools can be generalized to a population of gender-segregated schools and extent to which students allocated for mathematics or language arts represent a population of the respective students [5].

By arguing that previous research studies did not address possible ‘school selection effects’, Hayes et al. [7] have made careful consideration of the research sample (484 respondents from Southwest United States) as well. Aiming to permit true causal inferences of the research they thoroughly devised three different groups: (1) girls attending a public single-sex middle school, (2) girls who applied to the same public single-sex school but were rejected and therefore subsequently attended public coeducational middle schools, and (3) girls attending a public

magnet, coeducational middle school (Hayes et. al, 2011, p.694). Thereby the authors attempted to ensure that there were no indirect effects which would affect robustness of the outcomes [9].

Jackson [10], similarly, adopted non-probability *purposive sampling*, which enabled to explore full scope of issues. Therefore, since qualitative research highlights the uniqueness and distinctiveness of particular group of individuals, hence, it does not seek to generalize the findings employed sampling technique and sample size were appropriately chosen [9]. The sample constituted 79 (40 girls and 39 boys) participants answering the questionnaire and 11 (5 girls and 6 boys) students being interviewed within one school. Because while sampling interview participants in qualitative research there are no rules as it aims to interpret and describe rather than generalise Jackson did not indicate his chosen 11 interviewees.

Instruments

Validity and reliability of the research highly depends on the means of measurement in view of the extent to which the instruments are accurate to take intended measurements [12].

That Couinard et al. [6] have used widely known research self-reporting mathematics attitude scale (developed by Fennema and Sherman 1976), perceived self-competence scale (developed by Harter 1982) and achievement goals scale (developed by Bouffard 1998) and validated them in French language utilised instruments account to be evidence of high validity and reliability. However, the usage of *mathematics attitude scale* with the aim to measure students' perception on both mathematics and language arts is not as justifiably valid even though in the authors mention that the scale was adapted. Moreover, as they used translated version of adapted measurements, it was necessary to pilot it with students before applying it which would certify reliability and validity of the instruments [9]. One of the strength of the research study is the consideration of correlation of between two subjects which enhances internal consistency of the research [9]. The author indicated 'cronbach alpha' for each of the measurements which were substantially high, not less than 0.70 while acceptable coefficient is 0.67 [9].

When researchers use existing data sets it can be advantageous in a sense that it saves time, bears less cost and there is no need to develop the instruments ([13] . The merits of such longitudinal data have been used by Hayes et al. [7] . However, this convenience also has its limitations due to the data being collected for the different purposes; therefore some concepts researchers wish to measure can be infeasible [13] . Hayes et al. [7] adopted *standardised test scores* which indicated each school's achievements in mathematics and reading skills. According to Mujis [13] although the reliability of the data from school districts is often unknown the existing data are invaluable reserve for research in education which can serve as an effective tool for answering particular research questions.

Similarly the study carried out by Jackson [10] was one of the aspects of much larger project which concerned about self-concept, social comparison and gender of the students in schools. With the aim to establish credibility of the research the author implemented multiple methods: the data were retrieved both from the questionnaires and interviews. The former was completed by students about pupils' perception of the difference between single-sex and mixed schools. The author does not explicitly indicate the type of administered questionnaires merely indicating that there were nine questions which sought to investigate pupils' personal perceptions about single-sex mathematics classes. Further author employed semi-structured interviews, which is advantageous in that the schedule for the interview is outlined but is suitably open-ended to allow the contents to be varied throughout the conversation by expanding or altering questions appropriately for the determination of further [9]. The beneficial peculiarity of semi-structured interview can be referred to two main factors: the interviewer may elicit in-depth information about particular variable and because the interview is semi-structured which allows having 'pre-set questions' interviewer knows what is actually important.

Research design and procedure

Having analysed the sample and the instruments applied by researchers, Couinard et al. [6] and Hayes et al. [7], it can be logically concluded that the approach they take lies within pure positivistic approach.

Due to popularity and ubiquity of survey research many may believe that survey research is the easiest approach to collect data, however it is not entirely true because it has many complications to consider [13].

The study conducted by Couinard et al. [6] is non-experimental survey research. The authors intended to identify the relationships between variables which account for students' performance in single-sex or coeducational schools [13]. The authors applied longitudinal correlation study which allows making repeated measures at diverse time periods [14]. The priority of the longitudinal study lays in its distinctive characteristics that it enables collecting data over the time identifying the changes timely, and offers high accuracy [9]. The procedure of the data collection was clearly indicated. The data were collected four times from both cohort groups during three years. The questionnaires were taken during regular school classes and took 30 minutes to complete, which resembles authors' awareness that questionnaire should be sufficiently short and up to 30 minutes [13]. The research could have been enhanced by the application of observational study or the survey among teachers as it would allow longitudinal approach to be more beneficial [13]. Bearing in mind the weaknesses of the 'longitudinal study' which can influence on reporting research results the authors did not mention that the dependent variables could be affected due to any plausible 'events' contributing to it – the threat of internal validity, *history* in particular [9].

Similarly Hayes et al. [7] also adopted non-experimental exploratory design. Since authors entirely relied on existing data from school districts, the analysis of the study procedure is not appropriate. However, as it is stated by Mujis [13] while using existing data sets the combination of both quantitative and qualitative data often enables findings to be richer, therefore the researchers could have employed qualitative interviews with the students to enhance the validity of the outcomes.

Although Jackson [10] does not explicitly define his approach the context of his data collection suggests interpretivistic approach. Since researcher's aim was to explore students' conceptions about the classroom type based on their experiences it seems that he adopted phenomenology i.e. phenomenological research seeks to investigate how people experience the phenomenon and what kind of perspectives do they have. This may refer to the strengths of his approach because he attempted to holistically investigate the situation in depth. However the author did not provide any information neither about appropriate measures to mitigate the bias nor about piloting the interview, which is essentially important to establish validity [9]. However, unlike Couinard et al. [6] and Jackson did not clearly provide the organization of his study, it is not clear what was the environment setting during the administration of the questionnaire, how much time did questionnaire take for the students to complete, the duration of the interview was not identified either, this in turn, may affect *internal validity* of the research [5]. Techniques used in the process of semi-structured interview were also left unexplained, it is implicit whether the author recorded or videotaped the interview, the indication of which would add a value to internal consistency and trustworthiness to the research [8]. Finally it would be appropriate to comment on the skills of the interviewer(s), and whether there were more interviewers which would allow minimizing data collector bias [5].

Data analysis

The methodology of analysis utilised by Couinard et al. [6] is approached by factorial design, which allows the research finding to be more explicit since the current research has several independent variables which have a potential interaction [5]. Therefore, the use of such design in data analysis potentially enables researchers to see the whole picture of possible joint influence independent variables have on dependent variables, in this case girls' attainment in respective school domains can be influenced by a particular set of different causes [5]. Admitting that the numerous measurements of variables by ANOVA can have a chance of

making a Type I error (null hypothesis is rejected – single-sex schools are better for high achievement) the author utilised Bonferroni correction to reduce its probability [14]. The data analysis implemented by Hayes et al. [7] carries high complexity and nuanced approach towards identification of difference. The authors employed multiple approaches which consisted of five exploratory tests. By the implementation of *t-test* for independent samples to compare two different groups of the students Hayes et al. [7] aimed to find out whether school gender composition influence students' achievement. The applied t-test helped to measure the actual effect of gender environment to avoid multicollinearity problem which might occur due to high correlation of the type of schools [13]. The application of such measurement helped to ensure the validity of the outcomes, before proceeding to regression model.

As well as qualitative data, phenomenological data is analysed by coding, which categorises ideas from the information elicited as a result of interviewing (Cohen et al., 2011). Since Jackson [10] did not present the procedure of his data analysis, the type of coding remains uncovered. It is not clear how the author made meaning of the collected data; accordingly, it is not realistic to evaluate the applicability of analysis due to insufficient information on the procedure. Therefore there might be a threat to the validity and reliability of the research outcomes, the information presented in the results remains unjustifiable: it may have a risk to contain selective, unrepresentative information [9].

Conclusion

The description of the results is consistently provided with the detailed statistics. The findings Chouinard et al. [6] and Hayes et al. [7] suggest that there is no significant difference in girl's academic achievement between single-sex and coeducational schools. However, the outcomes Chouinard et al. [6] present might be biased due to the limitations of self-reporting questionnaire. The fact that given answers by respondents might not represent their sincere beliefs and attitudes because they desire to seem 'correct' may have led to biased conclusion, this term is explained by Robson [6] as 'a social desirability response bias' (p. 240).

Even though the analysis of the data suggested that boasted higher test scores Hayes et al. [7] summarize that there is no actual significant effect of the segregation due to the pre-existing academic skills. However, given that the primary objective was set to compare girls' efficacy in respective schools by eliminating school-driven or student-driven biases, arguably, the conclusions of the research seem to not correspond to the findings. On the other hand, this causes an assumption that the authors failed to use the instruments properly which led to unconvincing dubious results.

However, according to the findings presented in by Jackson [10] who took interpretivistic approach to analyse whether single-sex schools enhance girls' achievements propose that girls' attainment is significantly reinforced in gender segregated environment. Converse to the previous studies, Jackson's findings suggest that girls enjoy gender segregated classes. In the interview they could communicate their opinions about the experience of being taught in single-sex classes. The girls had a perception that learning in segregated classrooms is much more effective, they feel more comfortable without boys who may interrupt and intimidate them in subject classes. However, since the author did not comment on the data collector as well as on the analysis and the type of questionnaire the validity of outcomes could be questioned. Jackson [10] did not stipulate the technique of his questionnaire which would align with the expression of *fitness for purpose* (Cohen et al. 2011).

To conclude, the purpose of the essay was to evaluate the methodology from the critical point identifying possible strengths and weaknesses. The studies showed that self-reporting questionnaires, the usage of existing data set and insufficient information about the process of data collection have certain limitations which substantially inflate the rigor of the outcomes.

Thus the question of single-sex schooling effectiveness again might remain disputed. However, it could be assumed that as long as such schools incorporate highly effective gender-

inclusive student approaches sex segregated classrooms have a potential to enhance the participation and attainment of the students. This, perhaps, may encourage further study on teacher effectiveness in respective schooling domains.

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СУЩНОСТЬ ИССЛЕДОВАТЕЛЬСКОЙ КОМПЕТЕНЦИИ КАК ОДНОЙ ИЗ СОСТАВЛЯЮЩИХ КОМПЕТЕНЦИЙ СОВРЕМЕННОГО ПРЕПОДАВАТЕЛЯ ИНОСТРАННОГО ЯЗЫКА

Аннотация. Проблема современного иноязычного образования становится все более и более актуальной. Это в большей степени связано с экономическими и политическими изменениями в нашей стране, а также смены конечной цели иноязычного образования в пользу формирования межкультурной компетенции. Традиционно, было принято считать, что эффективность педагогического процесса напрямую зависит от знаний учителем предмета и основ педагогики. Чем больше знает