RiSE
INTERNATIONAL JOURNAL OF SOCIOLOGY OF EDUCATION

Hipatia Press
www.hipatiapress.com

Instructions for authors, subscriptions and further details:

http://rise.hipatiapress.com

Equal Education

Richa Mittal[1], Bani Bhattacharya[1]

1) Indian Institute of Technology Kharagpur

Date of publication: February 25th, 2013

To cite this article: Mittal, R., Bhattacharya, B. (2013). Equal Education. International Journal of Sociology of Education, 2(1), 51-66. doi: 10.4471/rise.2013.21

To link this article: http://dx.doi.org/10.4471/rise.2013.21

RISE - International Journal of Sociology of Education Vol. 2 No. 1 February 2013 pp. 51-66

Equal Education

Richa Mittal
Bani Bhattacharya
Indian Institute of Technology Kharagpur

Abstract

In educational research literature the role of education as a means for social upward mobility is quite well accepted. However, there are examples where education conserves and perpetuates social class. Each year, after the campus placements, one comes across a familiar situation where some students get selected and some others with equal academic achievements get rejected. This event occurs when one has almost completed one's education. The problem that lies at the root of this observation is that students do not enter school/college with equal cultural, social and economic capital. Teachers with their egalitarian values treat them as equals, making no distinctions among them. They ignore the obvious distinctions among students rather than addressing them, thereby, helping preserve these differences. The school teachers ignore, the college teachers ignore and finally the professional teachers also ignore the differences. Consequently the differential in the cultural and social capital of students continues. To find out whether education preserves or bridges these differences the author studied the impact of annual family income, level of father's education, level of mother's education, father's profession, mother's profession, area of location of school and the medium of instruction at school on the performance of students in three different types of engineering colleges. The findings are discussed along with educational implications. The paper is concluded with suggestions for the educators and their renewed responsibilities in the light of findings.

Keywords: social capital, cultural capital, preserving social class, engineering education

ISSN 2014-3575
DOI: 10.4471/rise.2013.21

RISE - International Journal of Sociology of Education Vol. 2 No. 1 February 2013 pp. 51-66

Educación Igualitaria

Richa Mittal
Bani Bhattacharya
Indian Institute of Technology Kharagpur

Resumen

En la literatura de investigación educativa el papel de la educación como un medio de ascenso social es muy bien aceptado. Sin embargo, existen ejemplos donde la educación conserva y perpetúa la clase social. Cada año, después de la asignación de plazas en el campus, se dan situaciones familiares donde algunos estudiantes son seleccionados y otros con los mismos logros académicos son rechazados. Este evento se produce cuando casi se ha completado la educación. El problema que se encuentra en la raíz de esta observación es que los estudiantes no entran a la escuela/universidad con igual capital cultural, social y económico. Los maestros con sus valores igualitarios les tratan como iguales, no hacen ninguna distinción entre ellos. Ignoran las diferencias evidentes entre los estudiantes, en lugar de dirigirse a ellos, por lo tanto, ayudan a preservar estas diferencias. Los maestros ignoran, los profesores ignoran y finalmente los profesores de universidad ignoran las diferencias. Por lo tanto continúa la diferencia en la capital cultural y social de los estudiantes. Para averiguar si la educación conserva o supera estas diferencias, la autora estudió el impacto del ingreso familiar anual, el nivel de educación del padre, el nivel de educación de la madre, profesión del padre, la profesión de la madre, la zona de ubicación de la escuela y el medio de instrucción en la escuela en el rendimiento de los estudiantes en tres diferentes tipos de centros educativos de ingeniería. Las conclusiones se exponen junto con implicaciones educativas. El documento concluye con sugerencias para los educadores y sus responsabilidades renovados a la luz de los resultados.

Palabras Clave: capital social, capital cultural, preservar la clase social, educación en ingeniería

ISSN 2014-3575
DOI: 10.4471/rise.2013.21

Engineering education is essential for the progress of a nation, economical usage of its natural resources and for maintaining ecological balance (Denton, 1998; National Knowledge Commission Report to the Nation, 2006-09; Dimova & Markova, 2010). In India, there is a very huge demand for engineering education because it promises a high prestige career. Engineering colleges arrange placements for their students on the campus. Recruiters are invited to the college campus to offer jobs to deserving students. Recruiters conduct interviews for selecting students. It is observed that some students get selected and some others with equal academic achievements get rejected. A serious problem lies at root of this paradox. Even after being above average students throughout the 15 years of their education and about to complete their professional education these students still have not acquired the necessary communication skills (Grant, & Dickson, 2006; Le, & Tam, 2008) and perform poorly in placement interviews. Observing them all nattily dressed in formals to attend their placement interviews one could still tell their socio-economic class apart. Education is considered a means to achieve upward social mobility but this observation shows that social class has been preserved even after 15 years of education. This urged the researcher to find out the factors influencing students' preparation and performance in engineering education in India.

Objective

1. To study the influence of background factors on the preparation and performance of students studying engineering education in India.
2. To explore the mechanisms through which the background variables affect students' performance.

Literature survey

The literature survey established that similar anomaly is reported in countries of Europe, Asia and also in the US (Bourdieu, 1974; Lareau, 2003; Wells, 2008; Yamamoto & Brinton, 2010; Tondeur et al., 2011). A lot of educational research has looked into the role of students' background variables in influencing students' performance, self concept

and satisfaction with life (Lent et al., 2007). The results have been more or less conclusive with Conlon (2005), Li (2007), Crisp et al. (2009), and Verma and Kapur (2009) reporting students' background variables like caste, class, ethnicity, socio-economic status and gender have a bearing on their academic performance and success but Zhang et al. (2004), reported that they observed the relationship between background variables and academic performance only in a few institutions, not in all. Therefore, there is need to empirically establish the impact of annual family income, medium of instruction, area of location of school, father's educational qualification, mother's educational qualification, father's profession and mother's profession on students' performance in engineering education in India and then to explore the mechanisms through which the many background variables affect students' performance. This information is necessary to be able to find ways to minimize their influence.

Methodology

A mixed methods study including both the quantitative and qualitative paradigms of research was selected because it provides the objectivity through quantitative component and the rich first hand qualitative descriptions provide the explanations of the observed phenomenon (Jick, 1979; Creswell et al., 2003; Sweetman et al., 2010; Hesse-Biber, 2010; Creswell, 2011). There are mainly three types of Institutions providing engineering education for Bachelor of Engineering/Technology Degree; first are Central Government funded institutions, second are State Government funded and third are privately funded colleges. The background factors would influence students differently in the three types of institutions therefore; using purposive technique one representative of each of the three types of institutions was selected. Data was collected from 740 students studying in the 3rd year. It was decided to interview 20% of the students because interview is a very time consuming technique and students have busy daily schedules. Researcher's observations were also carefully noted down. Factual data was collected on a datasheet prepared by the researcher. Students' marks in all the subjects in class ten and class twelve board examinations, their having taken special coaching for admission to

engineering college and the duration of coaching were found out and these together comprised their preparation. Students' academic performance was measured through their Semester Grade Point Averages for 5 semesters. The background factors considered were: the medium of instruction in school, area of location of school, annual family income, fathers' education, mothers' education, fathers' profession and mothers' profession.

Data collection

Permission was sought from the Heads of the three institutes for collecting data from students. Having got the permission, the researcher requested the teachers to allow her to distribute the datasheets to the students for collecting data. The purpose of research was explained to students and they obliged by filling in the factual datasheets and some also agreed for interviews. Data was collected from 740 students. From Central Government Institute 409 boys and 48 girls from State Government College 84 boys and 21 girls, and from private college 115 boys and 62 girls gave data (the ratio between girls and boys in the sample was reflective of their ratio in the three colleges respectively). These students were in the age group of 19-25 years. The students filled in their name, age, sex, marks in all the subjects in class ten and twelve board examinations, the medium of instruction in their school, the area of location of their school (rural, suburban, and urban), father's educational qualification, mother's educational qualification, father's profession, mother's profession, annual family income, any coaching they had taken, duration of coaching and their Semester Grade Point Average for the five semester-end examinations they had taken in their engineering college. 12 students were interviewed individually and about 135 students in groups. Few teachers were also interviewed and the transcripts of the interviews were written down.

Analysis

The collected data was entered in the data editor of the Statistical Package for Social Sciences (Field, 2009). Students' age, marks in all subjects in class ten and class twelve board examinations, annual family

income, duration of coaching, and Semester Grade Point Average were in ratio scale. Their sex, medium of instruction in their school, area of location of their school, their parent's education and occupation were categorical variables.

Findings

Preliminary descriptive analysis was carried out for all the factors measured on continuous scale to understand the characteristics of data. Looking at the means one found that the students of Central Government Institute were youngest in age, had highest means in all the subjects in class ten and twelve board examinations, came from families with highest annual incomes and had taken coaching for the longest duration among the students of three colleges. The students at the State Government College were oldest in age and came from families with lowest income among the three colleges. They had higher means in all the subjects in class ten and twelve, and had taken coaching for longer duration than students at private college. The students at private college had lowest means on almost all the subjects in class ten and twelve and had taken coaching for the shortest duration. One way analysis of variance was used to reject the null hypothesis of no difference among the students so that the three colleges could be treated as separate groups for further analysis.

To find the impact of the various categorical background factors, performance of students from one category was compared with the performance of students from other category through independent sample t-test (Guilford, & Fruchter, 1978; Ferguson, & Takane, 1989). To see the influence of family income, the data was shuffled to arrange income variable in ascending order. From each college, the performance of 30 students from highest income families was compared with 30 students with lowest income. The means of students from high income families were higher in all subjects in class ten and twelve and they had higher Semester Grade Point Averages for all semesters but according to the t-test results some of these differences were not significant. In Central Government Institute, the means of students from high income families in English in class ten, in Physics, Chemistry and Mathematics aggregate in class twelve and Semester Grade Point Averages in 1^{st,} 2^{nd,}

3rd, and 4th semesters were significantly higher but Semester Grade Point Average in 5th semester was not. This showed that family income had an impact on students' prior preparation and performance but the influence gradually decreased as students progressed in their engineering education probably because of the availability of a good library and continuous INTERNET connectivity. Many students got merit cum means scholarships also which eased the effect of limited resources. In State Government College, students from high income group had significantly higher means in all the subjects in class ten (except for Social Studies in class ten) and twelve and also Semester Grade Point Averages of all 5 semesters. In private college, students from high income group had significantly higher means in all subjects in class ten and in English in class twelve but not in Physics, Chemistry and Mathematics aggregate in class twelve and Semester Grade Point Averages of 5 semesters.

To understand the impact of medium of instruction, the performance of students coming from English medium schools is compared with the performance of students from regional language medium schools. All the means of students from English medium were more than regional language medium students' but a few of these differences were not significant. At Central Government Institute, the students from regional language medium had significantly lower means in Social Studies in class ten, in all subjects in class twelve and in 1st and 2nd semesters in engineering education. They came from families with significantly lower annual income and had taken coaching for shorter duration. At State Government College, means in English, regional language, Social Studies in class ten and in Physics, Chemistry and Math aggregate in class twelve and Semester Grade Point Averages in 1st, 4th and 5th semesters are significantly lower for students from regional language media and also these students have come from families earning significantly lower incomes. At private college, the means of students from regional language medium in English, regional language, Social Studies in class ten, in English in class twelve and Semester Grade Point Averages in all the 5 semesters are significantly lower than the means of students from English medium schools.

Area of location of school had 3 categories; rural, suburban and urban. Leaving the middle category of students from schools located in

suburban area, the performances of students from rural and urban schools were compared. The means of students coming from schools located in urban areas were higher on all the measured variables than the students coming from schools located in rural areas but some differences were not significant. In Central Government Institute, the mean in Physics, Chemistry and Math aggregate in class twelve was not significantly lower for rural students but all other means were significantly lower. In State Government College means in Physics, Chemistry and Math aggregate in class twelve and also in Semester Grade Point Averages 1st and 2nd semesters were not significantly different for rural and urban students. In private college means on all performance measures were significantly lower for students from rural schools but there was no difference in the mean annual family income of the rural and urban students.

Father's education had 4 categories: uneducated fathers, educated up to school, educated up to colleges and professionally educated fathers. Leaving the two middle categories, comparisons were made between the means of students whose fathers were uneducated and those whose fathers were professionally educated. Both at Central Government Institute and State Government College, predictably, professionally qualified fathers earned much higher annual income and the students with professionally qualified fathers earned higher Semester Grade Point Averages in all the 5 semesters. For private college this comparison could not be made because there was only one uneducated father.

Mothers' education was recorded in four categories similar to fathers' education categories. Comparisons were made between students whose mothers were uneducated and whose mothers were professionally qualified. Obviously professionally qualified mother contributed towards the family income and so the families had much higher income. The students with professionally qualified mothers at Central Government Institute took coaching for longer duration and got higher Semester Grade Point Averages in all the 5 semesters. In State Government College none of the differences were significant. In private college the students whose mothers were professionally educated had significantly higher means only in Social Studies in class ten and in English in class twelve.

Fathers' professions were entered in 4 categories; father engaged in agriculture, in business, in service and in profession. Leaving the two middle categories, means of students with fathers engaged in agriculture were compared with students whose fathers were in professions. For Central Government Institute, means on Math and Science aggregate in class ten, income, duration of coaching, Semester Grade Point Averages for 5 semesters were significantly higher for students whose fathers were professionals. At State Government College, students whose fathers were professionals had higher means in English in class ten, higher Semester Grade Point Averages for all 5 semesters and also had higher family income. In private college, students whose fathers were engaged in agriculture had significantly lower means in all subjects in class ten and English in class twelve, had lower family income, and had taken coaching shorter duration.

Similarly students whose mothers were housewives were compared with those whose mothers were professionals. At Central Government Institute students whose mothers were housewives had much lower family income, took coaching for shorter duration and had lower Semester Grade Point Averages in 2nd and 5th semesters. At State Government College students whose mothers were housewives had lower means on English in class twelve and had lower family income. In private college, the students whose mothers were housewives had lower means on Math and Science aggregate in class ten and lower family income.

To investigate the influence of sex the performance of girls was compared with boys and in all the colleges. For all the factors girls' means were higher than boys' means. The girls came from higher income families, more girls came from English medium schools located mostly in urban areas with more educated parents. Even with much better academic preparation and background than boys, only 10% of all students are girls in Central Government Institute, 20% in State Government College and 35% in private college. The better preparation and performance of girls rules out the academic reason for this disparity in sex ratio. During interviews, the girls at Central Government Institute told that most parents did not want to send girls to colleges away from home and so did not encourage them to prepare for the Joint Entrance

found that girls studying engineering were either the only child or had just one more sibling and came from families where both parents were educated. Girls came from higher income families than boys in State Government College and private college. Most of the girls came from English medium schools located in urban area, from families where both parents were educated and were engaged in professions. Girls from low socio-economic families with more than two siblings with less educated parents residing in rural or suburban areas seemed to have limited access to engineering colleges.

The impact of background factors on students' prior preparation as well as their performance in all the different types of engineering colleges is empirically seen (The trends appear to be fluctuating because different combinations of background factors, some having positive influence and some negative, become operational for different students). The cause for worry is that these differences continue to exist when the students are near completion of professional higher education. The effects seen above are quantifiable because preparation and performance factors are measured on continuous scale. The impact on students' self concept, confidence level, attitude towards life and their soft skills is not easily measurable; it may be found out by interviewing the students and observing them.

Therefore, to find out the mechanisms which cause these influences 12 students were interviewed individually and 135 in groups. The students from lower income families said that they took time to adjust in the hostel. The students from middle and higher income families admitted to being prepared for the hostel life by their parents in advance and receiving a continual support from their families making adjustment easy.

The students from lower income families said that they had come from schools with regional language medium and had poor understanding of English which made them shy and reserved. Some admitted to being very lonely because they were hesitant in making friends. Students said they got some relief if they could find other students from their own state, who spoke the same language as them and came from similar socio-economic background. Those who did not find people from the same background admitted to becoming very depressed. They said they were worried because they had great difficulty in

understanding lectures in class. Some students reported that since their communication skills were very poor they were not able to write the long answers in the exam and scored poor marks. They also said that they were very anxious about securing a job in campus placements. Students at private college told that many of their seniors were working in less paying jobs meant for technicians even after completing the 4-year-engineering degree course because the employers did not find them fit for engineers' jobs (NASSCOM & Mckinsey Report, 2009; World Bank Policy Research Paper quoted in India Education Review, 26th Sep 2012).

A student told that he had passed the extremely difficult Joint Entrance Examination to enter Central Government Institute but even after studying there he certainly looked ill at ease and far from being confident. In complete contrast were the students from families where both parents were educated. They said their parents had sent them to better schools and provided them with more facilities and more exposure. Their parents spent both time and effort to teach personal grooming, social skills, etiquette, appropriate body language and nonverbal communication skills to them (Lareau, 2003). As a result, the children from higher socio-economic status entered school not only with more economic capital but also with more social and cultural capital (Bourdieu, 1974).

According to the students who possessed cultural, social, and emotional capital the mechanisms which create such capital were the patient efforts of their conscientious educated parents (Lareau, 2003). They said they were sent to good schools; their progress in studies and extra-curricular activities was monitored by their parents. They were taught the importance of immaculate personal grooming, wearing clothes according to occasion. The significance of balanced diet, correct meal times, and table manners were taught to them. Their parents took them for picnics and vacations. They were taken to museums, shown art, architecture, sculpture, and also botanical and zoological gardens. Their parents read to them when they were too small to read themselves, this inculcated the habit of reading. They were encouraged to recite and read poetry, epics, and mythology. Their parents patiently tried to answer their questions and encourage their natural curiosity instead of stifling it through strict discipline. They were taught to question, rather

than follow blindly. A sense of aesthetics was developed in them by appreciation of fine arts, theatre, music and films. They emulated the socially appropriate body language and non-verbal communication of their parents from early childhood and so those had become as automatic as reflex actions for them.

The students from low socio-economic status did not get the above described inputs from their parents. When they left home to go to residential colleges they found it difficult to adjust, they felt very awkward in the unfamiliar atmosphere.

Suggestions

For those students whose parents are not educated, who come from poor rural backgrounds, the responsibility of ingraining the social and cultural capital falls squarely on the teachers. When a small child is corrected he/she does not feel ashamed but at higher education level if one is corrected one becomes very self-conscious therefore, these problems should be taken care of in school. If teachers at primary level could pay more attention to students from low socio-economic status instead of paying equal attention then hopefully the schools will not preserve the social class but actually provide a leveling effect. Hence, an unequal attention by teachers at various levels of education could provide a solution to the problem. In early childhood the common etiquette can be taught to children without making them feel self-conscious. Younger years are also more plastic and children can be molded with greater ease by teachers willing to spend unequal time. Moreover, if all children, specially the shy ones, are encouraged to participate in extra-academic activities at all primary, secondary and tertiary levels better soft skills could be developed.

One teacher taking care of a class of 50 or more students might not be able to achieve noteworthy progress but with student-volunteers' help appreciable results could be achieved. The teacher could form co-operative learning groups or learning pairs in such a way that at least one student with more social and cultural capital is put as a leader of each group or pair. The teacher could sensitize her students and motivate them to help others who are not as fortunate as them. Moreover, the differences are less severe when the children are small

and teachers at that level can help develop more accepting and helping attitudes in students thereby minimizing the differences and not allowing them to perpetuate.

References

Bourdieu, P. (1974). The school as a conservative force: scholastic and cultural inequalities. In J. Eggleston (Ed.) *Contemporary Research in the Sociology of Education*. London Methuen & Co. Ltd.

Conlon, G. (2005). The determinants of undertaking academic and vocational qualifications in the United Kingdom. *Education economics*, 13(3), 299-313. doi: 10.1080/09645290500073787

Creswell, J. W. (2011). *Research design qualitative, quantitative and mixed methods approaches*. Third Edition, Sage Publications, London.

Creswell, J.W., Plano Clark, V., Gutmann, M., & Hanson, W. (2003) Advanced mixed methods designs. A Tashakkori & C. Teddlie (Eds.) *Handbook of mixed methods research in social and behavioral sciences* (pp. 209-240) Thousand Oaks, CA: Sage

Crisp, G., Nora, A., & Taggart, A. (2009). Student characteristics, pre-college, college, and environmental factors as predictors of majoring in and earning a STEM degree: An analysis of students attending a Hispanic Serving Institution. *American Educational Research Journal*, 46, 924-942. doi: 10.3102/0002831209349460

Denton, A. A. (1998). The role of technical education, training and engineering profession in the wealth creation process. Proceedings of the Institution of Mechanical Engineers, Part B: *Journal of Engineering Manufacture*, 212, 337-341. doi: 10.1243/0954405981515941.

Dimova, R., & Markova, V. (2010). Engineering education as a stage for successful professional career. www.iiis.org/CDs2010IMC/ICME_2010/PapersPdf/FB933WX.pdf

Ferguson, G. A., & Takane, Y. (1989). *Statistical analysis in Psychology and Education*. Sixth Edition, McGraw-Hill, Singapore.

Field, A. (2009). *Discovering statistics using SPSS*. Third Edition, Sage Publications, London

Grant, C. D., & Dickson, B. R. (2006). Personal skills in chemical engineering graduates: The development of skills within Degree

Programmes to meet the needs of employers. *Education for Chemical Engineers*, 1, 23-29. doi: 10.1205/ece05004

Guilford, J. P., & Fruchter, B. (1978). *Fundamental statistics in Psychology and Education*. Sixth Edition, McGraw-Hill, Singapore.

Hesse-Biber, S. (2010). Emerging methodologies and methods practices in the field of mixed methods research. *Qualitative Inquiry*, 16(6), 415-418. doi: 10.1177/1077800410364611.

Hesse-Biber, S. (2010). Qualitative approach to mixed methods practice. *Qualitative Inquiry*, 16(6), 455-468.doi: 10.1177/1077800410364611.

Jick, T. D. (1979). Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly*, 24 (4), 602-611.

Lareau, A. (2003). *Unequal Childhoods: Class, Race, and Family Life*. University of California Press, Berkeley, CA.

Le, K. N., and Tam, V. W. Y. (2008). On generic skill development: An engineering perspective. *Digital Signal Processing*, 18, 355-363. doi: 10.1016/j.dsp.2007.04.015

Lent, R. W., Singley, D., Sheu, H., Schmidt, J. A., & Schmidt, L. C. (2007). Relation of social-cognitive factors to academic satisfaction in engineering students. *Journal of Career Assessment*, 15(1), 87-97. doi: 10.1177/1069072706294518.

Li, W. (2007). Family background, financial constraints and higher education attendance in China. *Economics of Education Review*, 26, 725-735. doi: 10.1016/j.econedurev.2007.09.001

NASSCOM (National Association of Software and Services Companies) & Mckinsey Report: 75% Indian engineering students unemployable. Published on 9th November 2009.

Tondeur, J., Sinnaeve, I., van Houtte, M., & van Braak, J. (2011). ICT as cultural capital: The relationship between socioeconomic status and the computer use profile of young people. New Media & Society, 13,151-168. doi: 10.1177/1461444810369245.

Varma, R., & Kapur, D. (2010). Access, satisfaction, and future: undergraduate education at the Indian Institute of Technology. *Higher Education*, 59, 703-717. doi: 10.1007/s10734-009-9275-0

Wells, R. (2008). The effects of social and cultural capital on student persistence: Are community colleges more meritocratic? *Community College Review*, 36, 25-34.

Yamamoto, Y., & Brinton, M. C. (2010). Cultural capital in East Asian educational systems: The case of Japan, *Sociology of Education*, 83,67-83. doi: 10.1177/0038040709356567.

Zhang, G., Anderson, T. J., Ohland, M. W., & Thorndyke, B. R. (2004). Identifying factors influencing engineering student graduation: A longitudinal and cross-institutional study. *Journal of Engineering Education*, October 2004, 313-320. Retrieved on 1.5.2012 from www.jee.org/2004/october/831.pdf

Richa Mittal is Research Scholar in the Center for Educational Technology at the Indian Institute of Technology, India.

Bani Bhattacharya is Head of the Center for Educational Technology, Indian Institute of Technology, India.

Contact Address: Direct correspondence to Richa Mittal at Indian Institute of Technology Kharagpur, Kharagpur - 721302, India. Email: mirichaa@gmail.com