HERJ Hungarian Educational Research Journal, Vol 9 (2019), No 2

Thematic Article

Hungarian Educational Research Journal
2019, Vol. 9(2) 147–164

https://akademiai.com/loi/063
Akadémiai Kiadó
DOI:10.1556/063.9.2019.1.18

Student dropout from universities in Europe: A review of empirical literature

Barbara M. Kehm[1], Malene Rode Larsen[2] & Hanna Bjørnøy Sommersel[3]

Abstract

This contribution is based on an extensive literature review of student dropout in Europe, which was carried out by a research group of the Danish Clearinghouse for Education in cooperation with an international expert group in 2012/2013. The review served to answer three basic questions: What is dropout? Why does it occur? What can be done to reduce or prevent it? Only empirical studies were included in the review and altogether 44 studies were included. The article points out that student dropout is a more complex and multidimensional issue than most people think and that it is important to distinguish between formal dropout (i.e., leaving university studies altogether before degree completion) and transfer (i.e., changing subject and/or institution). The review summarizes and discusses the main results of the 44 studies included in terms of nine dimensions: (a) study conditions at university, (b) academic integration at university, (c) social integration at university, (d) personal efforts and motivations for studying, (e) information and admission requirements, (f) prior academic achievement in school, (g) personal characteristics of the student, (h) sociodemographic background of the student, and (i) external conditions. The conclusions provide an answer to the three questions posed above and include recommendations for further research, university leadership, and policymakers.

[1] Leibniz University, Hannover, Germany, Email address: barbara.kehm@lcss.uni-hannover.de

[2] The Danish Center for Social Science Research, Kopenhagen, Denmark, Email address: mlr@vive.dk

[3] The Danish Evaluation Institute, Kopenhagen, Denmark, Email address: hbs@eva.dk

Recommended citation format: Kehm, B. M., Larsen, M. R., & Sommersel, H. B. (2019). Student dropout from universities in Europe: A review of empirical literature. *Hungarian Educational Research Journal*, *9*(2), 147–164. DOI:10.1556/063.9.2019.1.18

Keywords: student dropout in Europe, study conditions, academic and social integration, prior academic achievement, sociodemographic background

Preliminary Remarks

This contribution is a summary of a report analyzing available empirical research literature about student dropout from universities. The study was commissioned by The Swiss Council for Educational Research and carried out in 2012/2013 by a research group of the Danish Clearinghouse for Educational Research. Members of the research group were Michael Sogaard Larsen, Kasper Pihl Kornbeck, Rune Muller Kristensen, Malene Rode Larsen, and Hanna Bjørnøy Sommersel. The group was supported by a review group consisting of international experts in the field: Donald Brody (Sweden), Barbara M. Kehm (Germany), Per Fibak Laursen (Denmark), Rie Troelsen (Denmark), and Samuel Muhlemann (Switzerland). The full technical report and a summary report are available online (Larsen, Korbeck, Kristensen, Larsen, & Sommersel, 2013; Larsen, Sommersel, & Larsen, 2013). One individual case study of student dropout from Danish universities has been published (Troelsen, 2014). The research group at the Danish Clearinghouse does no longer exist. The full technical report (Larsen, Korbeck, et al., 2013) as well as the brief version of the report (Larsen, Sommersel, et al., 2013) was never published (except online). Still, the findings were sufficiently interesting and generalizable that they merit publication. The following article is a summary of the main results. It is not intended to provide an update of the literature review but rather give an account of the body of research-based, established, and accepted knowledge on student dropout including the underlying theoretical basis.

Introduction

In 2012/2013, a systematic review of empirical literature was carried out to gather evidence about phenomena of student dropout from universities. The study focused on three central questions: What is dropout? Why does it occur? What can be done by universities to prevent or reduce it? As such, the systematic review provided insight into how prior research has handled the problem of student dropout and collected all available knowledge from existing research results during data extraction. To carry out a full systematic research mapping (coding and data extraction) followed by a systematic evidence synthesis, a software tool (EPPI Reviewer; EPPI Centre at the Social Science Research Unit of the UCL Institute of Education, University of London; eppi.ioe.ac.uk) was applied. The review process began with an extensive database and literature search based on the scope of the review with input from the review group of international experts in the field. The search universe consisted of 18 international databases, two webpages of major research players in the field, and three key journals (Larsen, Sommersel, et al., 2013, p. 14). As a consequence of the research questions, only

studies with a quantitative or mixed-methods content were included in the review. Other search criteria included publications from the year 2000 onwards from all EU member states, Norway, and Switzerland; studies offering the possibility to operationalize the results and making sense in the light of the three central questions; and studies applying an outcome measure. Furthermore, secondary research from the USA, Canada, New Zealand, and Australia were to inform the findings from the European studies. The first database and literature search identified 6,392 references, which were then screened for relevance. The initial screening yielded 523 references. However, some of these had been published before the year 2000; others offered data about student dropout from outside Europe, etc. After this second screening, altogether 69 relevant documents remained referring to 62 different studies. These 62 studies were then first mapped according to their characteristic features and second assessed for sufficient quality. The assessment/classification process was carried out in cooperation with the review group. The quality assessment resulted in 44 studies being eventually included in a narrative synthesis of the findings extracted from these studies (Larsen, Sommersel, et al., 2013, p. 47). A detailed description of the whole review process is available in Larsen, Korbeck, et al. (2013, p. 25ff).

Definition of Dropout and Theoretical Framework

Conceptualizing dropout is a matter more complex than most people think. The common description refers to students leaving their university studies before having completed their study program and obtained a degree. Temporary dropout due to illness or pregnancy, for example, is not considered in this review. In statistical terms, student dropout is calculated as attrition rate in contrast to retention rate or graduation rate both of which imply a positive outcome. However, dropout can be voluntary, for example, if a student transfers to another university or changes his or her subject (both of which are not a proper dropout); or decides to leave the university for a job offer on the labor market; or it can be forced due to financial reasons, personal problems, or family-related circumstances. Another parameter frequently analyzed in the research literature is the timing of the dropout (early vs. late). Finally, dropout has consequences for society (in socioeconomic terms), the university (in funding, performance, and academic-related terms), and at a personal level for the student himself or herself (self-doubts and waste of time and money). Personal- and family-related consequences can be even more serious if dropout occurs among international students, i.e., students who have left their home country in order to get a university degree abroad. At the level of national policy, many countries around the world have equal opportunities or widening access policies in place in order to increase the number of highly qualified people for the knowledge society and economy. In any case, there are push and pull factors at work when trying to conceptualize dropout. Push factors are

factors within the chosen university or degree program relating to student interests and competencies; pull factors are factors outside the university or degree program relating to job offers, financial, or family problems (Bound & Turner, 2011; Larsen, 2000; Ulriksen, Madsen, & Holmegaard, 2010).

There are many factors to explain student dropout from universities. For this study, Tinto's socialanthropological approach to American college student dropout was used, which focuses on the longitudinal and multifactorial process leading to dropout (Tinto, 1975, 1987, 1993, 1998). Tinto's "Student Integration Model," first described in 1975, determines a student's social and academic integration in college to be a crucial factor within the process causing an individual student to drop out or not. Tinto's model emphasizes the process-based interactions between the individual student's attributes and the institutional structures at university. He acknowledges that external factors may play a role as well but their effects are treated as indirect factors. Tinto distinguishes between involuntary dropout (e.g., due to academic failure) and voluntary withdrawal (e.g., because of transfer to another institution or another subject) because these types of dropout do not only involve different persons but are also the result of different interactive processes within the university (Larsen, Sommersel, et al., 2013, p. 9f).

Tinto's model of college student dropout has later been refined by Heublein, Hutzsch, Schreiber, Sommer, and Besuch (2003; Heublein, Spangenberg, & Sommer, 2010) in order for it to work in a European university context. In their theoretical model, they include preuniversity and intrauniversity factors and point to specific factors that influence dropout but are external to the university setting, i.e., factors which were somewhat neglected by Tinto. Such external factors are related to students' financial situation, living conditions, family support, opportunities for counseling as well as students' own plans for the future. Thus, Heublein et al. (2010, p. 14) distinguish between factors arising from the preuniversity phase (e.g., sociodemographic background, study prerequisites, and choice of university/study program), factors arising from the intrauniversity phase (e.g., achievement potential, mental resources, study motivation, integration, and study conditions), and factors influencing the decision-making phase whether to drop out or not (e.g., availability of counseling services and future plans; Larsen, Sommersel, et al., 2013, p. 10f).

Factors Influencing Dropout and Transfer Decisions

The analysis of the 44 empirical studies included in the review yielded altogether nine factors, which influence decisions about whether to drop out or not or whether to transfer to a different study program, subject, or university. These nine factors are relevant dimensions of evidence to answer the central research questions of the review:

- Study conditions at university
- Academic integration at university
- Social integration at university
- Personal efforts and motivations for studying
- Information and admission requirements
- Prior academic achievement in school
- Personal characteristics of the student
- Sociodemographic background of the student
- External conditions

In the following, the results for these dimensions of evidence will be presented.

Study conditions at university

Study conditions at university are one of the few dimensions, which the university itself can alter to prevent or reduce dropout. Study conditions themselves are multifaceted when analyzing their effects on dropout or transfer decisions of students. Twenty-two of the studies included in the review investigated one or more aspect of study conditions. Of these, 8 found significant results for the influence of study conditions, 3 found only insignificant results, and 11 had mixed results. Despite the fact that not all studies analyzed here operationalized study conditions in the same way, the findings are available for altogether six aspects. The first aspect is institutional resources, which has been mainly analyzed in a British context and comprises among other things, the number of students per lecture or seminar, the composition of the student body in terms of the proportion of research graduates, qualification level of staff, research intensity, general staff–student ratio, academic expenditure per student, library expenditure per student, etc. Evidence is quite clear that the higher the amount of institutional resources, the lower the risk of dropout.

The second aspect is curriculum, study structure, and organization of exams, which all have been investigated mainly within a German context. None of these dimensions seem to exert a statistically significant influence on dropout when measuring satisfaction levels with the content of studies and the organization of exams. However, a Spanish study showed that teaching and examination methods demanding more activity from the side of the students seem to motivate them more, resulting in more students passing the exam and fewer dropouts.

The third aspect comprises the learning environment and the learning quality in the framework of which satisfaction with the physical conditions at university and the quality of teaching and the curriculum is measured. Two Danish studies found that these features only have an indirect effect on dropout or transfer decisions. In contrast, four British studies

showed that high teaching and research quality lead to a significantly lower risk of dropout. However, one of these studies stated that this applies to pre-1992 universities only. Another UK study also showed that the quality of the learning environment has the greatest explanatory power for decisions to drop out or to transfer.

Evidence is mixed concerning the effects of support and counseling services on dropout decisions, which is the fourth aspect. Four studies have analyzed this aspect. Similarly, there were mixed results in the three studies measuring peer effects, which is the fifth aspect. Still, male students seem to be more sensitive to different kinds of peer effects than female students. The sixth aspect related to study conditions at university is the subject of study. Despite the fact that here as well the overall picture is mixed, the risk of dropout is particularly high within the hard sciences. Twelve studies included in the review have looked into this aspect.

Overall, studies analyzing study conditions at university suggest that those aspects, which can be controlled by the university, have the potential to lower the risk of dropout. However, the mostly mixed evidence on this dimension is related to the contextual narrowness of the studies available for synthesis (Larsen, Sommersel, et al., 2013, pp. 20–24).

Academic integration at university

Academic integration at university is a dimension, which can be partly influenced by the university itself but is also partly related to students' personal traits and dispositions. Twelve studies available for this review have included one or more aspects of this dimension, which is operationalized into two main features: objective and subjective features of academic integration.

Eight studies looked into objective features of academic integration, e.g., exam results or European Credit Transfer Scheme points earned. There is strong and not surprising evidence, i.e., the better the academic performance the lower the risk of dropout. Another seven studies looked into subjective features of academic integration (e.g., self-perceived progress, integration, and interaction with academic staff). There is solid evidence of a significant relationship between subjective (i.e., self-perceived) integration and dropout, i.e., the better the subjective integration, the lower the risk of dropout. If students experience problems of meeting the academic standards the dropout risk becomes high. Thus, it matters considerably how a student performs academically at university (Larsen, Sommersel, et al., 2013, p. 24f).

Social integration at university

Our third dimension is social integration at university which is – like academic integration – partly influenced by the university and partly by personal traits and dispositions of the

student. There was only a small evidence base for this dimension as just seven studies under review here looked into this.

Only one out of seven studies linked the degree of social integration directly and in a statistically significant way to dropout. However, social integration is also linked to some extent to the quality of the learning environment because it includes aspects of well-being, which in turn is one of the most important factors influencing decisions to drop out or to transfer. A related aspect analyzed by four studies in a British context is student housing. Living on campus reduces the risk of dropout because peer support networks can be formed academically as well as socially. Overall, the dimension of social integration has a weak evidence base and the evidence itself is unclear with low generalizability (Larsen, Sommersel, et al., 2013, p. 25f).

Personal efforts and motivations for studying

The dimension of personal efforts and motivations for studying is again partly related to factors the university can influence and partly to factors linked to personal traits and dispositions of the student. Altogether, 10 studies available for review investigated motivation as a potential determinant for dropout. It is important to distinguish between extrinsic and intrinsic motivation here. Intrinsic motivation (e.g., interest in the subject) significantly reduces both dropout and transfer as several studies could show, whereas extrinsic motivation, such as interest in the future job, seems to have some importance but could not be proven statistically in terms of its significance for dropout.

Personal effort in form of investing more time in self-study also results in a lower risk of dropout and transfer. Ten studies included in this review investigated this aspect. It is altogether not surprising that more (intrinsic) motivation and more personal effort reduce the risk of dropout and transfer (Larsen, Sommersel, et al., 2013, pp. 26–28).

Information and admission requirements

Information and admission requirements are a dimension of preuniversity entrance that might well affect choice of subject and institution. Therefore, on one hand, this dimension can be influenced by the university but it is also related to personal preferences and ambitions. Altogether eight studies included in this review have analyzed this dimension.

Admission requirements are dependent on the degree of institutional or subject-related selectivity (e.g., admission quotas, entrance examinations, numerus clausus, etc.). Four studies directly investigated the effect of different types of admission on dropout. An overall trend seems to be that admission via tests, which are, however, not grade-based, seems to lower the risk of dropout. Analysis of admission via grade-based tests shows an

unsurprising result, namely that the higher the score, the lower the risk of dropout and of transfer.

The two studies that investigated the role of information (e.g., about study demands in subjects) prior to application and entrance had contrasting results. One study found that such information does not have a direct effect on dropout; the other study found that information has a statistically significant influence on dropout. However, altogether, the evidence base about the effects of information and admission requirements on dropout is weak and evidence itself is mixed (Larsen, Sommersel, et al., 2013, p. 28f).

Prior academic achievement at school

This dimension has been analyzed most extensively, i.e., by 28 of the studies included in this review. It is operationalized into three aspects: upper-secondary school achievement, upper-secondary school subject focus, and upper-secondary school type.

There is strong and not surprising evidence that high-school marks lower the risk of dropout, although a couple of studies found the opposite to be true and five studies obtained mixed results. The relationship between high-school marks and transfer is not statistically significant. In terms of the subject focus in upper-secondary school, special attention has been given to mathematics. Eight studies have included this subject and five of them showed that doing well in mathematics reduces the risk of dropout. Altogether 17 studies included an analysis of the role of upper-secondary school type (i.e., public vs. private) on dropout. The evidence for this aspect is unclear, possibly due to the fact that school types are difficult to compare across Europe in terms of their resources, student body composition, accessibility, and share of private schools.

Overall, there is solid evidence that academic achievement in school is a strong predictor of dropout from university, whereas it cannot be used to predict transfer decisions (Larsen, Sommersel, et al., 2013, p. 30f).

Personal characteristics of the student

The dimension of personal characteristics of the student is typically divided into background characteristics like age and gender on one hand and personal traits and dispositions like learning approach and conscientiousness on the other hand. Background characteristics can be influenced by university policies targeting the composition of the student body, whereas personal traits cannot be influenced by the institution.

Student age was included as a variable in 19 of the studies under review of which 15 showed significant findings for an effect of student age on dropout. When it comes to

dropout, younger students are found to have a lower risk of dropout than older ones. There were no significant findings related to transfer students when it comes to age.

Gender was included in 23 of the studies under review of which 15 obtained significant results for an effect of gender on the risk of dropout. Again results are different for dropout and for transfer students. Dropout is clearly higher among male students compared to female students and this holds true across a range of subjects. In contrast, there is no significant difference between male and female students among transfer students.

The effects of personal study approach (e.g., learning approach and study skills) on dropout have been investigated by four studies. Only conscientiousness is found to be significantly related to dropout. Thus, no clear picture arises of an effect of such personal traits on the risk of dropout.

Interestingly, three studies have analyzed the role of gap years for dropout and the results showed that delayed enrollment significantly increases the risk of dropout but lowers the likelihood of transfer.

Overall, evidence of personal characteristics affecting the risk of dropout and transfer is somewhat mixed. Age and gender have a clear effect on dropout, i.e., the younger the student the lower the risk of dropout; male students are more prone to dropout than female students, while results for the likelihood of transfer are less clear. Delayed enrolment because of a gap year increases the risk of dropout but lowers the likelihood of transfer (Larsen, Sommersel, et al., 2013, pp. 31–35).

Sociodemographic background of the student

Students' sociodemographic background was included in 16 studies reviewed here by measuring educational attainment and occupational level of parents. Studies analyzing educational attainment of parents come from a wide range of European countries, whereas studies analyzing occupational level of parents have been conducted mainly in a British context. There might be data protection laws at work in a number of countries, which prevent inclusion of parental occupational level.

Although some of the studies showed mixed or even insignificant results, there is firm evidence that high educational attainment of parents reduces the risk of dropout but plays a much weaker role among transfer students. Concerning the occupational level of parents (i.e., social class), it is not surprising that three studies find significant effects of parents' occupational level on dropout, i.e., the higher the level the lower the dropout risk. However, one further study obtained only insignificant findings and five other studies had

mixed results. Half of these studies focused exclusively on medical students, so that we can say that the relationship between the student's sociodemographic background and dropout is weaker among medical students (Larsen, Sommersel, et al., 2013, pp. 35–37).

External conditions

There are some conditions called "external" here that cannot be influenced by the university. These conditions have been investigated by 14 studies, which were included in this review. Conditions were divided into finanical situation and students working part-time while studying.

The financial situation of students can vary considerably depending on whether they have to pay tuition fees, whether there are grants or loans or scholarships available, or whether there is financial support from the family. Furthermore, the situation might be different for domestic and for international students. Altogether, 10 studies looked into students' financial situation as a potential determinant of dropout. Despite the fact that one might expect that financial hardship increases the risk of dropout, the findings of the studies under review here are mixed. One UK study found that being a non-UK fee paying student as compared to a UK fee paying student does not increase the risk of dropout. Another UK study found that the likelihood of transfer is lower among non-UK fee-paying students than it is among UK fee-paying students. Two other studies found that international students are more prone to dropout than UK students unless they are self-financed. In Germany, students from low-income families receive financial aid from the state. Germany is also a country, which does not have tuition fees, not even for international students. A German study found that students who receive financial aid from the state are less likely to drop out than students who do not receive any financial support. The same study also found that state financial assistance increases the likelihood of transfer. Overall, the possible effects of students' financial situation on dropout are mixed.

Not many studies have investigated the potential effects of having a (part-time) job while studying on the risk of dropout. Only two studies included in this review have done so. One study showed that working 20 hr per week or more greatly increases the risk of dropout, whereas the other study obtained only insignificant results in terms of hours spent on work while studying. Thus, it is not possible to establish any clear evidence for this aspect (Larsen, Sommersel, et al., 2013, pp. 37–39).

Answering the Questions: What Is Dropout, Why Does It Occur, What can be Done to Prevent or Reduce It?

The review and synthesis of findings from altogether 44 studies tried to establish what kind of evidence is available to answer three questions: What is dropout? Why does it

occur? And what can be done to prevent or reduce it? What follows is a summary of the answers to these questions, which could be gained from the review.

What is dropout? The studies included in the review provide clear evidence that there are different types of dropout, which are influenced by different factors. Voluntary dropout often leads to transfer, either to another subject or to another university or both. Involuntary dropout often leads to actual dropout from university studies altogether. Involuntary dropout is largely predicted by factors at work before university entrance, for example, by sociodemographic and socioeconomic background of the student and by prior academic achievement in school. The likelihood of transfer is more strongly influenced by factors occurring within the university but still related to personal dispositions and traits of the student, for example, by a student's motivation for study and his or her educational goals. Furthermore, early dropout (e.g., in the first year) is different from and happens more often than later dropout. Conditions that are external to the university influence late dropout decisions rather than early ones. Transfer tends to happen early during a course of study. There is only little evidence to what extent dropout has detrimental effects on occupation, career, income, and use of skills as compared to graduates. For this aspect, further research is needed.

Why does dropout occur? There is convincing evidence that dropout from university is a complex and multifaceted phenomenon. Evidence is strongest that sociodemographic background (i.e., parental level of education and their occupational status) and a student's personal characteristics (i.e., age, gender, and prior school achievements) affect the risk of dropout and this holds true across most subjects (except for medical students) and more often for male than for female students. Investing in institutional resources seems to work as a way to reduce the risk of dropout; however, this aspect has been analyzed almost exclusively in a British context. Improving a student's academic integration and increasing his or her motivation to put more effort into studying so that better progress can be achieved are further ways to reduce the risk of dropout. However, increasing a student's motivation has been found to increase the risk of transfer.

What can be done to reduce or prevent dropout? This question has only very rarely been touched upon in the studies included in the review. However, answers to the previous question contain some pointers as to what can be done to reduce or prevent dropout, e.g., increasing institutional resources and/or creating interventions to improve academic and social integration, motivation, study skills, and study effort. The close link between the second and the third questions is related to the fact that any activity with the aim to reduce or prevent dropout can only be successful if it is implemented based on sound knowledge why dropout occurs in the first place (Larsen, Sommersel, et al., 2013, pp. 39–41).

Finally a few points should be made concerning the limitations of this review. First, almost all of the 44 studies included in this review investigated possible determinants of dropout from university, whereas only three studies investigated possible effects of interventions aimed at reducing or preventing dropout. Therefore, the evidence is not equal for all three review questions. Second, the focus constitutes a potential bias toward findings obtained through quantitative approaches at the expense of "softer" qualitative aspects, such as student effort and satisfaction, study approach, and motivation. The frequent use of university administrative data and national register data in these empirical studies tends to neglect factors that can be influenced by the universities themselves, for example, in terms of students' academic and social integration. Thus, a sociological perspective is emphasized at the expense of a pedagogic perspective, which might be a feature of the research domain itself. Third, the choice of research design shows a striking lack of process-based analytic approaches, such as path analysis. Fourth and finally, none of the studies available for review have analyzed dropout phenomena across national borders. All studies are country-specific (Larsen, Sommersel, et al., 2013, p. 15f).

Conclusion: Implications for Research, Policy, and Practice

The review also made some recommendations addressed at researchers, policymakers, and practitioners.

For the research field, the necessity emerged to establish a clearer concept of dropout and distinguish between different types of dropout behavior, namely voluntary dropout/ transfer versus involuntary dropout, which is likely a dropout from university studies altogether. These two types of dropout have clearly different academic and economic consequences for the student and are based on different factors, prerequisites, and conditions. A second recommendation emerged from the lack of knowledge about possible effects of interventions aimed at reducing or preventing dropout. A greater use of experimental designs in terms of studying interventions is recommended. The research domain of student dropout could also benefit from a greater use of cohort/longitudinal studies, which investigate the possible determinants of dropout in the framework of a process-based and time-line perspective. The research domain would also profit from research focusing more on factors that occur inside the university and which the university can influence. The final recommendation pertains to transnational or internationally comparative studies in order to investigate potential effects of national-level systems characteristics on dropout (Larsen, Sommersel, et al., 2013, p. 42f).

Concerning the field of policy and practice, altogether seven recommendations were made addressed to the improvement of data availability and to conducting interventions (Larsen, Sommersel, et al., 2013, p. 44f):

- University authorities are encouraged to collect more and better administrative data, which should include reasons for dropout and transfer preferably at the individual level.
- University authorities and politicians should establish a student tracking system, for example, by introducing a unique student code valid nationally.
- University authorities are also encouraged to track students by conducting more post-exmatriculation follow-up surveys.
- University authorities should put more energy into setting up measures to reduce dropout during the early phases of studies.
- However, measures to reduce or prevent dropout are not exclusively in the hands of university authorities and policymakers. Therefore, it still seems that the best a university can do is to exert some degree of selectivity and recruit academically more able students.
- University authorities and policymakers could potentially reduce transfer rates by improving information services at the time of application.
- Finally, university authorities and policymakers should realize that investing in institutional resources has the potential to reduce dropout. This includes more attention to the quality of teaching.

Acknowledgements

The original literature review was funded by the Swiss Council for Educational Research. No funding was received to produce this article.

About the Authors

BMK is Fellow at the Leibniz Center for Science and Society of the University of Hannover, Germany. Previously, she was a professor of Higher Education Research at the University of Glasgow (UK) and at the University of Kassel (Germany). She has published more than 30 books and more than 300 journal articles and book chapters. Her main fields of specialization are university governance, internationalization of higher education, and reforms of doctoral education. She is currently working on a project about the future of the humanities. BMK produced this article with critical input from MRL and HBS. However, this article is a summary of a report produced in 2012/13 with the roles reserved. MRL and HBS were main authors with critical input from BMK (and others). Therefore, BMK invited MRL and HBS to be coauthors.

MRL holds an MSc in Political Science from Aarhus University (Denmark). Her research interest and work history – most recently from VIVE (The Danish Center for Social Science Research) – focus on educational and employment issues. The former includes topics such as dropout, mobility, and choice of path within the educational system. Her projects often

involve vulnerable groups, e.g. disabled people, ethnic minorities, and the elderly. MRL has primarily investigated these issues by applying quantitative, statistical methods to survey data, and administrative registers. Her research methods also include conducting systematic reviews (secondary research), a discipline that she has applied in the present publication on student dropout from universities.

HBS holds an MSc in Social Science from Copenhagen Business School. Her research interest primarily covers the field of education, and she is coauthor of a number of systematic reviews and research reports within educational topics. For many years, she has worked on the development of systematic reviews and research dissemination. Through positions at the Danish Clearinghouse for Educational Research and the Danish Evaluation Institute, she has worked purposefully to disseminate and communicate research to the political level and to the field of practice.

Ethics

The study procedures were carried out in accordance with the Declaration of Helsinki. No ethics issues were involved because the study was based on a literature review.

References

(a) Studies on Dropout Included in the Review[4]

Albrecht, A., & Nordmeier, V. (2011). Ursachen des Studienabbruchs in Physik. Eine explorative Studie [Causes of student dropout in physics. An explorative study]. *Die Hochschule. Journal fur Wissenschaft und Bildung*, *21*(2), 131–145. Retrieved from https://www.pedocs.de/volltexte/2019/16329/pdf/t2111.pdf

Araque, F., Róldan, C., & Salguero, A. (2009). Factors influencing university drop out rates. *Computers & Education*, *53*(3), 563–574. doi:10.1016/j.compedu.2009.03.013

Argentin, G., & Triventi, M. (2011). Social inequality in higher education and labour market in a period of institutional reforms: Italy 1992–2007. *Higher Education*, *61*(3), 309–323. doi:10.1007/s10734-010-9379-6

Arulampalam, W., Naylor, R. A., & Smith, J. P. (2004). A hazard model of the probability of medical school drop-out in the UK. *Journal of the Royal Statistical Society, Series A*, *167*(1), 157–178. doi:10.1046/j.0964-1998.2003.00717.x

Arulampalam, W., Naylor, R. A., & Smith, J. P. (2005). Effects of in-class variation and student rank on the probability of withdrawal: Cross-section and time-series analysis for UK university students. *Economics of Education Review*, *24*(3), 251–262. doi:10.1016/j.econedurev.2004.05.007

[4] The fact that there are more titles in this part of the bibliography than there were studies included in the review (i.e., 44) is linked to the fact that for some of the studies there were more than one publication available.

Baars, G. J. A., Stegers-Jager, K. M., Stijnen, T., & Splijnter, T. A. W. (2009). A model to predict student failure in the first-year medical curriculum. In G. J. A. Baars (Ed.), *Factors related to student achievement in medical school* (pp. 31–46). The Hague, Netherlands: Lemma.

Belloc, F., Maruotti, A., & Petrella, L. (2009). University drop-out: An Italian experience. *Higher Education*, *60*(2), 127–138. doi:10.1007/s10734-009-9290-1

Bennett, R. (2003). Determinants of undergraduate student drop out rates in a university business studies department. *Journal of Further and Higher Education*, *27*(2), 123–141. doi:10.1080/03098770320006515 4

Bodin, R. M., & Millet, M. (2011). L'université, un éspace de regulation: L'abandon dans les 1ers cycles à l'aune de la socialisation universitaire [Universities as a regulative space. Dropout in the first cycle as an indicator of university socialisation]. *Sociologie*, *2*(3), 225–242. doi:10.3917/socio.023.0225

Di Pietro, G. (2004). The determinants of university dropout in Italy: A bivariate probit model with sample selection. *Applied Economics Letters*, *11*(3), 187–191. doi:10.1080/1350485042000203832

Di Pietro, G., & Cutillo, A. (2008). Degree flexibility and university drop-out: The Italian experience. *Economics of Education Review*, *27*(5), 546–555. doi:10.1016/j.econedurev.2007.06.002

Garcés, A., & Sanchez-Barba, L. F. (2011). An alternative educational approach for an Inorganic Chemistry laboratory course in Industrial and Chemical Engineering. *Chemistry Education Research and Practice*, *12*(1), 101–113. doi:10.1039/C1RP90013G

Glaesser, J. (2006). Dropping out of further education: A fresh start? Findings from a German longitudinal study. *Journal of Vocational Education and Training*, *58*(1), 83–97. doi:10.1080/13636820600591743

Glocker, D. (2011). The effect of student aid on the duration of study. *Economics of Education Review*, *30*(1), 177–190. doi:10.1016/j.econedurev.2010.08.005

Hailikari, T. K., & Nevgi, A. (2010). How to diagnose at-risk students in chemistry: The case of prior knowledge assessment. *International Journal of Science Education*, *32*(15), 2079–2095. doi:10.1080/09500690903369654

Heublein, U., Hutzsch, C., Schreiber, J., Sommer, D., & Besuch, G. (2010). *Ursachen des Studienabbruchs in Bachelor-und herkömmlichen Studiengängen: Ergebnisse einer bundesweiten Befragung von Exmatrikulierten des Studienjahres 2007/2008* [Causes for dropout in bachelor and traditional study programmes. Results of a national survey of exmatriculated students of the academic year 2007/2008]. HIS: Forum Hochschule, No. 2. Berlin, Germany: HIS GmbH.

Heublein, U., Spangenberg, H., & Sommer, D. (2003). *Ursachen des Studienabbruchs: Analyse 2002* [Reasons for dropout: Analysis 2002]. Hochschulplanung, No. 163. Hannover, Germany: HIS GmbH.

Hoff, J., & Demirtas, M. (2009). *Frafald blandt etniske minoritetsstuderende pa universitetssuddannelserne i Danmark* [Dropout among ethnic minority students in Denmark]. Copenhagen, Denmark: Forlaget politiske Studier.

Hovdhaugen, E. (2011). Do structured study programmes lead to lower rates of dropout and student transfer from university? *Irish Educational Studies*, *30*(2), 237–251. doi:10.1080/03323315.2011.569143

Hovdhaugen, E., & Aamodt, P. O. (2009). Learning environment: Relevant or not to students' decision to leave university? *Quality in Higher Education*, *15*(2), 177–189. doi:10.1080/13538320902995808

Johnes, G., & McNabb, R. (2004). Never give up the good times: Student attrition in the UK. *Oxford Bulletin of Economics and Statistics*, *66*(1), 23–47. doi:10.1111/j.1468-0084.2004.00068.x

Kinnunen, P., & Malmi, L. (2008, September 6–7). *CS minors in a CS1 course*. Paper presented at ICER '08 Proceedings of the Fourth International Workshop on Computing Education Research, Sydney, Australia, (pp. 79–90).

Kolland, F. (2002). *Studienabbruch: Zwischen Kontinuität und Krise. Eine empirische Untersuchung an Österreichs Universitäten* [Dropout: Between continuity and crisis. An empirical study at Austrian Universities]. Wien, Austria: Braumuller.

Lassibille, G., & Gómez, L. N. (2008). Why do higher education students drop out? Evidence from Spain. *Education Economics*, *16*(1), 89–105. doi:10.1080/09645290701523267

Loyens, S. M. M., Rikers, R. M. J. P., & Schmidt, H. G. (2007). The impact of students' conceptions of constructivist assumptions on academic achievement and drop-out. *Studies in Higher Education*, *32*(5), 581–602. doi:10.1080/03075070701573765

May, S., & Bousted, M. (2004). Investigation of student retention through analysis of the first-year experience of students at Kingston University. *Widening Participation and Lifelong Learning*, *6*(2), 42–48.

Nelson, A. (2008). Looking into one's own practice: A Swedish study on gender in educational sciences. *Journal of Further and Higher Education*, *32*(2), 139–149. doi:10.1080/03098770801911087

O'Neill, L. D., Hartvigsen, J., Wallstedt, B., Korsholm, L., & Eika, B. (2011). Medical school dropout. Testing at admission versus selection by highest grades as predictors. *Medical Education*, *45*(11), 1111–1120. doi:10.1111/j.1365-2923.2011.04057.x

O'Neill, L. D., Wallstedt, B., Eika, B., & Hartvigsen, J. (2011). Factors associated with dropout in medical education: A literature review. *Medical Education*, *45*(5), 440–454. doi:10.1111/j.1365-2923.2010.03898.x

Oosterbeek, H., & van Ewijk, R. (2010). *Gender peer effects in university: Evidence from a randomized experiment* (Tinbergen Institute Discussion Paper, TI 2010-113/3). Retrieved September 26, 2018, from https://papers.tinbergen.nl/10113.pdf

Ortiz, E. A., & Dehon, C. (2011). *The roads to success: Analyzing dropout and degree completion at university* (Working Paper). Brussels, Belgium: ECARES. Retrieved September 26, 2018, from http://homepages.ulb.ac.be/~cdehon/RHE_5yearsample.pdf

Pohlenz, P., & Tinsner, K. (2007). *Studienabbruch: Ursachen, Probleme, Begründungen* [Dropout: Causes, problems, reasons]. Saarbrücken, Germany: VDM Verlag Dr. Muller.

Qualter, P., Whiteley, H., Morleya, A., & Dudiak, H. (2009). The role of Emotional Intelligence in the decision to persist with academic studies in higher education. *Research in Post-Compulsory Education*, *14*(3), 219–231. doi:10.1080/13596740903139255

Smith, J., & Naylor, R. (2001a). Dropping out of university: A statistical analysis of the probability of withdrawal from UK university students. *Journal of the Royal Statistical Society, Series A*, *164*(2), 389–405. doi:10.1111/1467-985X.00209

Smith, J., & Naylor, R. (2001b). Determinants of degree performance in UK universities: A statistical analysis of the 1993 student cohort. *Oxford Bulletin of Economics and Statistics*, *63*(1), 29–60. doi:10.1111/1468-0084.00208

Soo, K. T. (2009). *Estimating the production function of university students* (Working Paper, 2009/018). Lancaster University Management School. Retrieved September 26, 2018, from http://eprints.lancs.ac.uk/48961/4/ProductiveFunction.pdf

Studenterradet ved Aarhus Universitet. (2000). *Frafald og studiemiljo* [Dropout and study experience]. Aarhus, Denmark: Studenterradet ved Aarhus Universitet.

Suhre, C. J. M., Jansen, E. W. A., & Harskamp, E. G. (2007). Impact of degree program satisfaction on the persistence of college students. *Higher Education*, *54*(2), 207–226. doi:10.1007/s10734-005-2376-5

Urlings-Strop, L. C., Stijnen, T., Themmen, A. P. M., & Splinter, T. A. W. (2009). Selection of medical students: A controlled experiment. *Medical Education*, *43*(2), 175–183. doi:10.1111/j.1365-2923.2008.03267.x

Van Bragt, C. A. C., Bakx, A. W. E. A., Bergen, T. C. M., & Croon, M. A. (2011). Looking for students' personal characteristics predicting study outcome. *Higher Education*, *61*(1), 59–75. doi:10.1007/s10734-010-9325-7

Vignoles, A. F., & Powdthavee, N. (2009). The socioeconomic gap in university dropouts. *The B.E. Journal of Economic Analysis & Policy*, *9*(1), 1–15. doi:10.2202/1935-1682.2051

Zwick, M. (2009). Stuttgarter Abbrecherstudie 2009. Zufriedenheit mit dem Studium und Abbruchneigung bei Studierenden des BA-Studiengangs Sozialwissenschaften an der Universität Stuttgart [Stuttgart dropout study 2009. Study satisfaction and dropout tendencies among students of the BA programme social sciences at the University of Stuttgart]. *Stuttgarter Beiträge zur Risiko und Nachhaltigkeitsforschung*, *14*, 1–55. doi:10.18419/opus-5506

(b) Further Literature

Bound, J., & Turner, S. (2011). Dropouts and diplomas: The divergence in collegiate outcomes. In E. A. Hanushek, S. Machin, & L. Woessmann (Eds.), *Handbook of the economics of education* (Vol. 4, pp. 573–613). Amsterdam, The Netherlands: Elsevier.

Heublein, U., Hutzsch, C., Schreiber, J., Sommer, D., & Besuch, G. (2010). *Ursachen des Studienabbruchs in Bachelor-und herkömmlichen Studiengängen. Ergebnisse einer bundesweiten Befragung von Exmatrikulierten des Studienjahres 2007/2008* [Causes for dropout in bachelor and traditional study programmes. Results of a national survey of exmatriculated students of the academic year 2007/2008]. HIS: Forum Hochschule, No. 2. Berlin, Germany: HIS GmbH.

Heublein, U., Spangenberg, H., & Sommer, D. (2003). *Ursachen des Studienabbruchs: Analyse 2002* [Reasons for dropout: Analysis 2002]. Hochschulplanung No. 163. Hannover, Germany: HIS GmbH.

Larsen, M. R., Sommersel, H. B., & Larsen, M. S. (2013). *Evidence on dropout phenomena at universities. Brief version*. Copenhagen, Denmark: Danish Clearinghouse for Educational Research. Retrieved September 26, 2018, from https://edu.au.dk/fileadmin/edu/Udgivelser/Clearinghouse/Review/Evidence_on_dropout_from_universities_brief_version.pdf

Larsen, M. S., Korbeck, K. P., Kristensen, R. M., Larsen, M. R., & Sommersel, H. B. (2013). *Dropout phenomena at universities: What is dropout? Why does dropout occur? What can be done by universities to prevent or reduce it?* Copenhagen, Denmark: Danish Clearinghouse for Educational Research. Retrieved September 26, 2018, from https://edu.au.dk/fileadmin/edu/Udgivelser/Clearinghouse/Review/Evidence_on_dropout_from_universities_technical_report_May_2013.pdf

Larsen, U. (2000). *Frafald og Studiemiljoe* [Diversity in the study environment]. Aarhus, Denmark: Studenterradet ved Aarhus Universitet.

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research*, *45*(1), 89–125. doi:10.3102/00346543045001089

Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago, IL: Chicago University Press.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student Attrition* (2nd ed.). Chicago, IL: Chicago University Press.

Tinto, V. (1998). Colleges as communities: Taking research on student persistence seriously. *The Review of Higher Education*, *21*(2), 167–177. Retrieved from https://muse.jhu.edu/article/30046

Troelsen, R. (2014). Is drop-out from university dependent on national culture and policy? The case of Denmark. *European Journal of Education*, *49*(4), 484–496. doi:10.1111/ejed.12094

Ulriksen, L., Madsen, L. M., & Holmegaard, H. T. (2010). What do we know about explanations for drop out/opt out among young people from STM higher education programmes? *Studies in Science Education*, *46*(2), 209–244. doi:10.1080/03057267.2010.504549