

University Dropout: The Case Study of the Petroleum-Gas University of Ploiesti

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Abstract—University dropout is at present the greatest scourge of the Romanian academic education. The main goal of this paper consists in the identification of the principal factors leading to dropout and consequently of the most efficient modalities of prevention and control of this phenomenon within the Petroleum-Gas University of Ploiesti (PGUP). To that purpose, an interdisciplinary study regarding the difficulties encountered by the students in their adaptation to the PGUP environment has been performed. The results of this study, based on a questionnaire distributed to the subjects in risk situation, are summarized and commented in the present paper. A predictive model developed by the authors trying to assess the future evolution of university dropout for the PGUP engineering faculties is also included in the paper.

Index Terms—university dropout, equality of opportunities, career development, continuous learning, Markov process.

I. INTRODUCTION

THE issue of university dropout has an important part in the worldwide preoccupations aiming at the social dimensions of education. These include even since the years '80 politics for increasing the participation and the degree of graduation in higher education, using edifying concepts such as: “dropout”, “non-persistence”, “academic performance / academic success versus failure”, “retreat”, “disengagement” [1-12].

From a public policy perspective, data regarding the participation in higher education are periodically collected by OECD using the “completion of studies rate” and the Eurydice structural indicators for monitoring education systems, which are also linked to the participation policies of the European Commission [13, 14]. The definition of the indicator concentrates on the percentage of students completing the high education program they have begun.

In Romania, the absence of such preoccupation is felt, University dropout being at present the greatest scourge of the Romanian education [15-20]. It perpetuates the shaky mentality of some young people who, lacking efficient means of control, do not succeed in wisely managing their choices. Permanent and continuous learning, the inoculation of the need for education involve learning activities warranting both fundamental academic knowledge and skills, and autonomous thinking abilities. Romanian education experiences today a huge provocation: the adaptation to the new requests of the labour market, simultaneously with the awareness of the utility of higher education.

That is why the achievement of a study regarding the students adaptation to the academic environment appears to be imperiously necessary in order to identify the factors causing dropout. Mostly, such concept is regarded as the renunciation at a wright. A responsible person, with a pragmatic attitude, is less predisposed to abandon. Instead, a reduced “*locus of control*” of a person who does not experiment the freedom of choice, triggers almost instantaneously the dropout idea.

The school dropout represents not only a willingly renunciation at the wright to education, but also at an evolution of the individual system of thinking. Superior education facilitates the adaptation of the future professional to the requirements of the labour market by directly involving the students in the selection of their formative trajectory. The transition high school – university is demanding: new exigencies, a different manner of teaching and learning, the need for independent study. The student’s expectances, often unrealistic, the lacunar emotional preparation, the confrontation with new personal and social experiences generate an adaptation effort intensely felt.

The adaptation process is neither easy nor fast, involving several *stages* [21]: *accommodation* (dominated by fears), *adaptation* (attracting benevolence), *participation* (based on psycho-social maturation and acceptance by the others), and also the *integration*, corresponding to the group dependence. That is why the link between the level of adaptation of the students and their academic performance becomes essential.

II. RESEARCH DESIGN, PARTICIPANTS AND METHODOLOGY

The investigation ground used to identify the main factors stimulating or inhibiting the university dropout is one of the most important academic institutions from Romania, that is the Petroleum-Gas University of Ploiesti (PGUP). Table I indicates a summary of the dropout rate for the five faculties of PGUP in the last four academic years (data collected by the authors from PGUP statistics).

The present study supplements the beneficial consequences of the supportive policy already initiated at PGUP level. Focused on the multifaceted approach of the factors mentioned above, our research cumulates interdisciplinary aspects. The behavioural model foreshadowed from the first semester of the first year of study leads to an outcome marked by the dropout. The analysis takes into account both the human behaviour attracted by rewards and the individual elements guaranteeing the unpredictability of the human nature.

TABLE I. PGUP FACULTIES DROP-OUT RATES

Faculty	Academic Year				
	2019 -2020	2020 -2021	2021 -2022	2022 -2023	2023 -2024
Letters and Sciences	8.83 %	9.71 %	8.26 %	11 %	20.43 %
Economic Sciences	7.83 %	9.75 %	10.75 %	7.8 %	9.85 %
Mechanical and Electrical Engineering	11.1 %	16.08 %	12 %	11.68 %	6.56 %
Petroleum and Gas Engineering	6.97 %	14.23 %	14.83 %	12.23 %	5.13 %
Petroleum and Petrochemical Technology	15.37 %	11.6 %	15 %	10.6 %	9.9 %

For such reason, an interpretative approach of this investigation was selected, the “reality” being built by the interpretation of some perceptions and attitudes of the students regarding the manner in which the level of education affects their own values system. Obtaining a university diploma cannot be achieved without investing time for education inside and outside school. However, the academic performance does not constitute a viable choice for all in the context in which the meritocratic principles based on academic education do not necessarily attract the desired status and financial rewards.

The information has been collected in May-June 2024 using the direct research method – gathering data directly from the respondent students. The used investigation

instrument has been the questionnaire. The same questions have also been distributed on-line, using Google Forms. Answers have been obtained from a number of 66 students (from the 1st and 2nd years) in risk situation (at least three remaining exams from the 1st year).

Even if the number of students being in such situation is much greater, 512 in the whole university, the lack of desire for cooperation can be partially justified by means of the psychological concept of “*acquired indifference/inability*”. Due to the repeated exposure to negative events, such as difficulties in assimilating school information, accumulation of failed exams, generating a less favourable image at the level of the study group, a person considers himself deprived of control means and gives up the attempt to improve his behaviour.

The structuring of the proposed questionnaire was based on addressing target-zones, such as: frequency of absenteeism and the main factors inhibiting the appetite for study, the general system of needs and interests correlated with the specificity of the perspective of each respondent, proposals/strategies of remediation of the subjects in risk situation in order to improve their attitude towards school / education results. In its component, there are seven questions, beginning with questions with closed answer fixing the statistical characteristics of the basic behaviour of the respondent. The questions with open answer follow aiming at highlighting the factors generating the university dropout. The subsequent open questions point out the compatibility between the needs and expectations of the student and PGUP managerial policy.

The major objectives of the present study are the configuration of strategic lines attenuating the discrepancy between the present situation and a desirable one, with beneficial changes of attitude from the part of the students towards the act of education, but also the outlining of typological profile of the PGUP student in risk situation. The basic premise is that, during the transition to adult age, the young people identify them with their projects, many times unrealistically ambitious. Such distance between aspirations and the capacity to satisfy them can induce a state of social alienation, promoting university dropout.

III. ANALYSIS RESULTS AND DISCUSSIONS

Within our study, looking at the distribution according to faculties of the respondents (Figure 1), a high percentage of those from the three engineering faculties (IME, IPG and TPP) was observed (39 students, that is 59.1%), fact correlated with an increased difficulty of the studies, especially in the situation of a major inconsistency between their option and the previous high school training. In addition, the duration of bachelor degree studies in this case is 4 years, increasing the time needed to be invested in education. Therefore, even if “*the investment in knowledge brings the best interest*”, according to Benjamin Franklin, the “*blank cheque*” payed is considered less and less prolific

for a person wishing to rapidly enjoy financial results due to the lack of material support from his family.

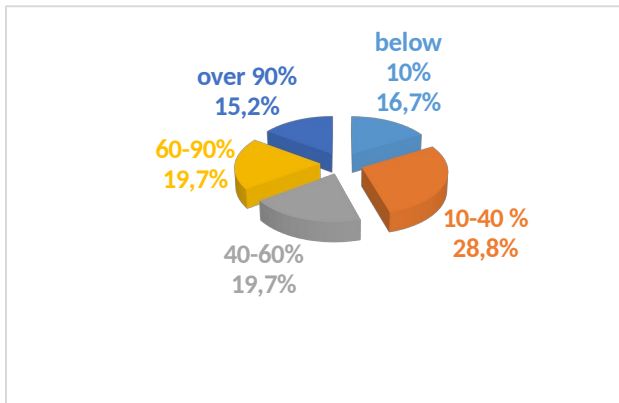


Fig. 1. Distribution according to the faculties of the respondents in risk situation: IME – Mechanical and Electrical Engineering; IPG – Petroleum and Gas Engineering; TPP – Petroleum and Petrochemical Technology; SE – Economic Sciences; LS – Letters and Sciences.

Analysing the distribution according to the year of study of the respondents, we observed that the students from the 1st year are the dominant category (62.9%), proving the preoccupation of equilibrating the balance effort (invested time, positive attitude, implication in the learning process) – effect (favourable results). In case of lack of equilibrium, the student will consider that the academic integration imposes him to reach high standards, clearly superior to his capability. The “*socially prescribed perfectionism*” diminishes the feeling of personal self-efficiency supplemented by the social comparison and by advertising in mass media of the profile “*man of success*”. The students from the 2nd year (37.1%) thus consider that the only option is to retire from the academic environment. We therefore consider that the validation of the effort and not of the relative results, the accent on highlighting the competences and not the requirement to mechanically assimilate the information, the symbolic rewards based on encouragements and appreciations constitute beneficial means in order to support these students.

The distribution of the answers regarding the periodicity of attendance at the teaching hours (Figure 2) show that the students understand the importance of participating at these hours (54.6%). Their precarious results require support from the didactical staff for a better tuning between their knowledge from high school and the curriculum of the university. There are also students (28.8%) that do not succeed in efficiently managing the transition towards the university environment, either due to the commitment to a job, or due to the underestimation of the difficulties of the academic requirements. A tailored counselling could constitute a sustainable remedy in such situation. Not lastly, 16.7% of the respondents are not keeping in touch with school, favouring the conditions for dropout. There is a clear tiebreaker between the students from the 1st year and the ones from the 2nd year. In the first situation, a high

percentage (52.4%) involving themselves physically in the learning process, while in the second case, 75% from the students loose the connection with school thus generating favourable circumstances for dropout.

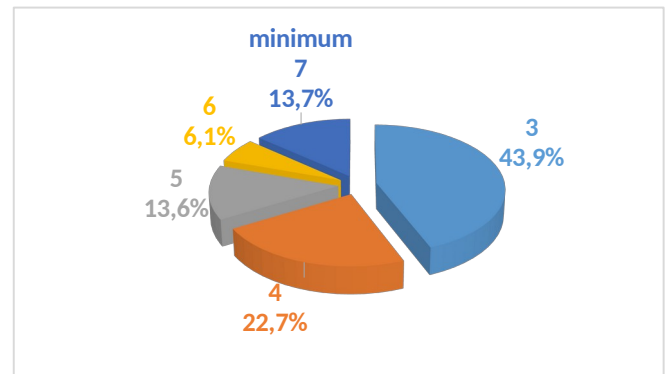


Fig. 2. Distribution of the periodicity of attendance at the teaching hours by the respondents.

We consider that the methods of stimulating the efforts of those who have difficulties of adaptation should be implemented as earlier as possible (after the 1st semester of the 1st year) by means of a proactive attitude of the teaching staff who, keeping their formative coherence, will prepare the students for a mature anchoring in the professional life. It is needed to rethink the modalities of assimilating information, by identifying the eventual errors (mechanical learning, lack of connection between theory and practice).

The next question targets the number of failed exams accumulated which, in the conditions of transgressing a reasonable limit (3-4 remaining exams), place the students in the risk area. When the real possibility of rehabilitation decreases, that tend to cease any action and to consider the university dropout normal. Figure 3 attest the fact that a percentage of 66.6% (43.9% with 3 failed exams and 22.7% with 4 remaining exams) from the respondents have real chances to fix their school results, requiring the corroboration of the self-management of their own learning style with the implication and support of the teaching staff. The motivational stimuli are partially of extrinsic nature, aiming at obtaining short (favourable results) and long (getting the university diploma) term benefits, but, at the same time, aversion reactions develop towards the possible unpleasant consequences (expulsion, dropout). Intrinsic motivations also appear such as: shaping a social finality of work, fulfilling the achievement desired [22].

In the second situation – 13.7% of students with at least 7 failed exams, we encounter an attitude of non-involvement / rejection of the influence of this pro-training campaign. The repeated negative school results generate psychic discomfort cancelled by substituting school performances with various achievements (choosing a job). The wrong impression of easily accessing well payed jobs with limited studies and especially the cult of the “models” of public persons in whose success learning did not count, leads to less wise choices.

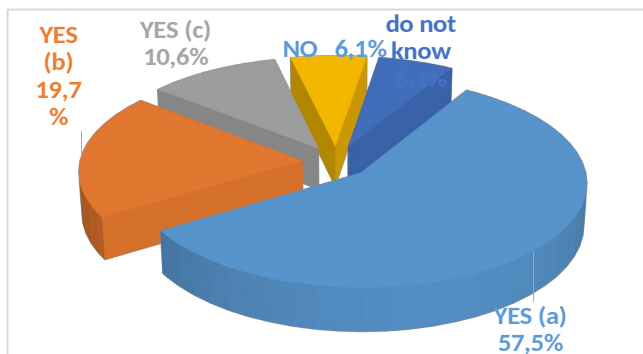


Fig. 3. Distribution of the students according to the declared number of the remaining exams.

The answers to the question aiming at the degree of importance of high education for personal development (Figure 4) attests almost unanimously (87.8%) the awareness by the students of the importance of continuing their studies. A percentage of 57.5% (from the total number of respondents) reclaim the need for self-achievement by giving answers convergent towards the basic idea: career/personal development. If the personal vision is not preceded by planning and efficient time management, such need remains only an unachievable aspiration. The incompatibility between the study program selected and the vocational characteristics will lead to the lack of interest for the chosen domain and to unrealistic expectations regarding the occupational profile.

Another category of respondents (19.7%) considers getting a university diploma a warranty for later obtaining sensibly greater incomes that in the case of a limited education. The answer attests either a pro-meritocratic attitude or a possible emblem of the provenience from disadvantaged environments. A minor category of students (10.6%) do not justify their position, fact correlated with an uncertain vision of the future or with the fact that their enrolment in the university was not a volunteer action. 6.1% of the respondents, even if enrolled in a faculty, deny the importance of studies for increasing the quality of life (Figure 4), and other 6.1% are undecided.

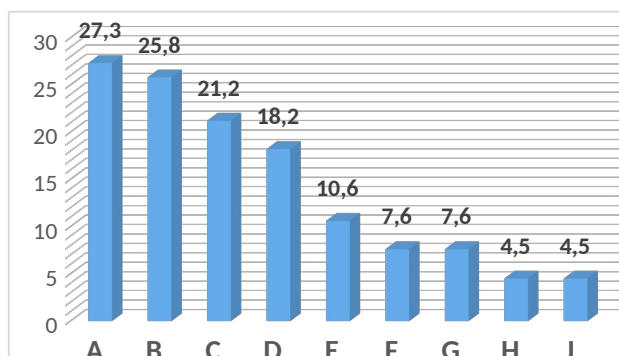


Fig. 4. Importance of the university studies for the personal / professional development and the distribution of the arguments (needs, interests, aspirations) sustaining such importance: a – personal / career development; b – better paid job; c – no arguments.

The next question is focused on detecting the main reasons for dropout of the students (Figure 5). Some motives are cumulated at the individual level, leading to the sensibly hindered management of some obstacles of various types. Lack of time (27.3%), financial problems (25.8%), accumulated stress (21.2%) and the feeling of lack of efficiency, as well as the eventuality of a job carried out in parallel with the educational act (18.2%), represent aspects often mentioned.

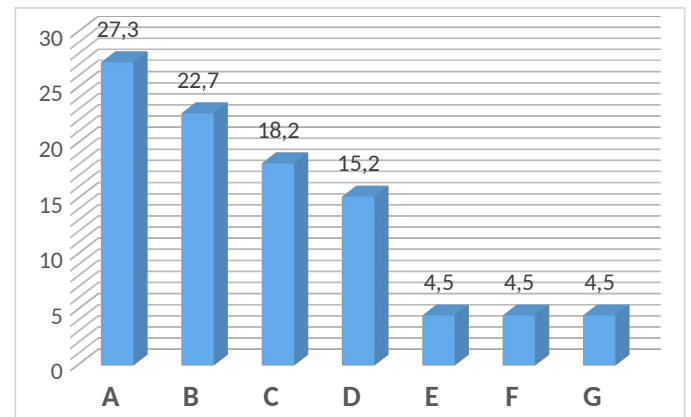


Fig. 5. Distribution of the motives favouring the university dropout: A – lack of time; B – financial problems; C – stress accumulation; D – a parallel job; E – lack of interest / uselessness of continuing the academic studies; F – inadequate choice of the study program; G – negative attitude of the professors / inadequate teaching methods; H – motives connected to the family; J – other motives.

The pressure/lack of time (27.3%) is developing in a context in which the respondents often expect to decide themselves their schedule, to have neither deadlines nor restrictions or confinements. The great number of teaching hours and their uneven scheduling contributes to the diminishment of the selection possibilities. The further dependence on their parents is not usually a valid option for young people who want to be more and more autonomous. However, their option (getting a job) makes difficult the fulfilment of the requirements of the student life, even if at a minimum level.

The financial problems invoked (25.8%) can block the full completion of the educational trajectory. Most of the young people well integrated in the university environment have often delegated to their parents the responsibility regarding the costs related to their personal life. The ones coming from disadvantaged environments (families with increased risk of poverty / social exclusion) do not have such opportunity, and the means of support for social cases are insufficient (the social scholarship strictly covers the accommodation and meals costs). That is why such persons are concomitantly searching for a place on the labour market. The autonomous commitment to education in the absence of a guide, the self-management of the resources, if lacking the parental protection, is inefficient.

Excessive stress constitutes another reason generating dropout (21.2% - Figure 5). The lack of a sufficient number

of credits (40) for advancing to the next year increases the feeling of inefficiency of their efforts. In the context of a random choice of the study program, of a vocational incompatibility causing disinterest, of an option under family pressure, of a precarious previous training, all corroborated with a great volume of information, deadlines, inefficient time management, the inoculation of a high level of stress is perpetuated.

The option for a job (even part-time) (18.2%) becomes a problem hard to manage for young people just passed by the age of adolescence. The pressure put on their shoulders by the employers by requiring years of experience goes against the universities rigours, prioritising a high frequency at the teaching hours and an active implication in projects. Having a parallel job while assuming the role of student presupposes, beyond the immediate benefits (financial support and autonomy, combining theory with practice, an early responsibility, etc.), additional time, effort and especially a lot of stress. Therefore, the student with a job resets his system of needs and interests and puts his studies in a secondary plane.

The lack of interest (10.6%) together with the inadequate selection of the study program (7.6%) are motives less invoked. Continuing the studies is a subjective option in a flawed context in which the correlation between the income and the level of studies is not always visible. Lesser percentages (4.5%) refer to the less adequate/empathic behaviour of the professors and to various family motives. We mention the fact that, due to the accumulation of more than one motive at the individual level, the sum of the invoked percentages is greater than 100%.

Summarising the listed motives, we can easily conclude that when the daily survival is at stake, many young people dropout the university studies (25.3% from the whole university even from the 1st year). It is not just a voluntary choice, but also a consequence of the provocations with which the society tests them. The students coming from disadvantaged environments are the most vulnerable ones. Time management favouring the job and the social life development, the interest for the interaction with the others facilitate a mentality favourable to sacrifice the academic projects, the students seeing in the offering fields (retail, call centre, tourism, etc.) gates to build their career and to gain experience.

Many times, young people do not understand that the option of enrolling in a faculty is in the first place a great opportunity offered to him by facilitating his professional achievement. The mature anchoring to this reality presupposes a permanent updating of their speciality knowledge and acquiring new one. However, when the student reaches the situation in which he does not find himself in the selected study program, he resents the inadequacy/non-adherence to the academic environment.

In addition, the fear of maladaptation to the academic requirements is correlated in some situation with the lack of flexibility of the teaching staff. The relationship with the

student must be nuanced and democratic, combining the exigence with the opening towards his needs and opinions. If the professor has an excessively reticent attitude towards the inadequate performance of the student, combined with a great number of absences, this can be easily converted in hostility. At the same time, the indifference of the professor threatens the integration need of the student in the academic environment.

The responding students understand the necessity to adopt individual measures, which can help them overcome the critical moment. Figure 6 illustrates different modalities to approach such problem, a better time management representing one of the most frequent opinions (27.3%).

$$T = \begin{pmatrix} 1.21 & 0.015 & 0.116 \\ 0.001 & 1.14 & 0.116 \\ 0.104 & 0.132 & 1.168 \end{pmatrix}$$

Fig. 6. Distribution of the student's proposals for the remediation of the risk situation: A – much greater frequency at the teaching hours; B – increased learning effort; C – increased motivation; D – they do not have proposals; E – no answer; F – giving up their job; G – another answer.

A majority percentage of respondents (50% - Figure 6, A and B) understand that the self-management of the academic educational process needs a revaluation, as they still have the required determination for self-motivation. In favourable conditions (support from the professors, cooperation and help from their colleagues), they will rehabilitate themselves, converting failure in success. There are also students (19.7% - Figure 6, D and E) for which the probability of improving their results is severely diminished due to absenteeism and passivity.

We select some of the most interesting modalities of improving the personal efficiency: high frequency (27.3%), motivation and determination (18.2%), changes in the learning methods (22.7%), increase of the level of self-discipline (1.5% – only one respondent), improving the communication with the professors (1.5%). Particularly, we point out the intention of some students (4.5%) to give up their job, aware of the fact that they are not able to establish a correct equilibrium between work and faculty. In only one case there is a complaint regarding a least supportive treatment carried out by some professors, complaint followed by the intention to continue the master degree within another university.

IV. PREDICTIVE MODEL USING MARKOV CHAINS

In the followings, a predictive model developed by the authors, using Markov chains / processes [23], is briefly presented and applied to assess the future evolution of university dropout for the PGUP engineering faculties (IME, IPG and TPP – see Figure 1) using data summarised in Table I.

The predictive model comprises the calculation steps below:

- The transformation of absolute data from Table I in relative data, shown in Table II.
- Calculation of the transition matrixes from each year to the next (using the methodology detailed in [23]).
- Adding the transition matrixes, M_{Tk} , the total transition matrix, T , is obtained:

$$T = \sum_{k=1}^n M_{T_k} \quad (1)$$

- By dividing each element of a line with the total of that line in the T matrix, the total probability transition matrix, P_T , results.
- The predicted structure for the next year, $year_{n+1}^T$, is obtained using the equation below:

$$year_{n+1}^T = P_T year_n^T \quad (2)$$

TABLE II. RELATIVE DATA FOR MARKOV MODEL

Academic Year	PGUP Faculty (relative values)			Total
	IME	IPG	TPP	
2019-2020	0.332	0.208	0.46	1.0
2020-2021	0.384	0.340	0.277	1.0
20121-2022	0.287	0.355	0.359	1.0
2022-2023	0.338	0.354	0.307	1.0
2023-2024	0.304	0.238	0.459	1.0

The total transition matrix T , the probability transition matrix P_T and the predicted structure for $year_{VI}^T$ (academic year 2024-2025) calculated for the data in Table II are the followings:

$$T = \begin{pmatrix} 1.21 & 0.015 & 0.116 \\ 0.001 & 1.14 & 0.116 \\ 0.104 & 0.132 & 1.168 \end{pmatrix}$$

$$P_T = \begin{pmatrix} 0.9203 & 0.0112 & 0.0865 \\ 0.0008 & 0.9069 & 0.0923 \\ 0.0741 & 0.094 & 0.8319 \end{pmatrix}$$

$$year_{VI}^T = \begin{pmatrix} 0.3165 \\ 0.2581 \\ 0.4263 \end{pmatrix}$$

Based on the results above, the following values have been assessed for the dropout rates of the three engineering

faculties in the academic year 2024-2025: 6.7% for IME, 5.35% for IPG and 9.55% for TPP.

V. CONCLUSIONS

On the background of quasi-permanent social changes and of the relativity of laws and regulations in education, school remains more and more often at the mercy of dropout. We are confronting today the disparition of the certitude that only by working an individual can gain an honourable place in society. The academic studies lose their relevance if their graduation is not correlated with a job/status adequate to the training. The decline of apparently stable occupations and the unprecedented development of AI creates major uncertainties when planning the professional future. The mirage of specializations well quoted on the labour market attract without discernment students that, once in the 1st year, confront great difficulties in adapting to academic requirements. The incompatibility with the vocational profile supplements the feeling of lack of adaptation and thus facilitates dropout.

Even if school infrastructure and the norms of adhesion to the collectivity have been updated, the gap between generations creates asperities at the level of reciprocal adaptation professor-student. The academic requirements remain too high for the young people with a precarious training. Communication blockages occur and the Romanian school, even if interested to identify the problems distracting young people from study, obtains minimum results, facilitating dropout.

Our study aimed at outlining a detailed diagnosis of the dropout situation at the PGUP level, marking some strategic actions for its remediation. The behavioural analysis of the individual has demonstrated the link between the area of origin, the family antecedents, the degree of support (including financial) from the parents and his attitude towards education. Therefore, the dropout issue is based on a complex and interactive causality.

We consider that the commitment of the teaching staff in sustaining education by supporting the students with problems of adaptation/understanding, his proactive attitude, the continuous feedback could all be translated at the level of the students who will be aware of the importance of education. Therefore, even if the needs of the student requires in some situations the assumption of multiple roles (student, employee, supporter of the family etc.), it is important for him not to choose subjectively between them, but to prioritise them.

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