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**RECEPTION OF SUBJECTIVITY OF CRITICAL THEORY
AND MACHIAVELLIANISM – A PROPOSAL FOR COMPUTER
AIDED DIAGNOSIS OF PATHOLOGY IN EDUCATION**

Introduction

For many centuries, education was the guarantee of human development. It began to play a special role in the eighteenth century, when under the influence of the Enlightenment ideas of Reason,¹ education became the promise of progress. The function of the education system was then to be the improvement of societies. Nowadays, certain phenomena can be observed in the education system, which, ostensibly implementing this idea, actually carry or may carry many risks for the future.

The authors of this article, while observing the Polish education system, can not accept the ossified administrative structures existing in the system and the triumph of economic objectives over the human ones, the latter understood as individuals having the opportunity for self-realisation (developing one's subjectivity). We want to ask what identities an education system functioning in this way would create? A lot of attention is devoted in the literature to the problem of education.² We also want to speak on this matter, for the sake of the common good which education undoubtedly is. We sincerely hope that the perception of problems in the system will lead to its repair and not its destruction.

This paper consists of two main parts. The first part presents the reconstruction of critical theory based on the philosophy of Theodor Adorno, Max Horkheimer and Jurgen Habermas, which concerns the concept of subjectivity. The notion of subjectivity emerging from the thoughts of the representatives of the Frankfurt School is then confronted with the image of man created by the Machiavellian thought, according to social sciences. This is followed by a description of the Machiavellian personality trait, based on the psychological interpretation of Machiavellianism, and not on the current philosophical interpretation. In the second part, the authors present the proposal for using computer exploration methods to identify Machiavellian behaviours. The proposed solution takes into account cognitive, educational and preventive aspects.

¹ The use of capital R in "Reason" refers to a mythologised version of the Enlightenment sense of this term.

² The problems of primary and secondary education were discussed, by, among others: B. Śliwowski, *Problemy współczesnej edukacji*. Warszawa 2009; B. Dumowska, *Edukacja autorska w szkołach publicznych w Polsce*. Kraków 2003. A review of problems in tertiary education was carried out by, among others: W. Ambroziak, K. Przyszczykowski, *Uniwersytet, społeczeństwo, edukacja*. Poznań 2004; M. Czerepaniak-Walczak, *Fabryki dyplomów czy universitas?* Kraków 2013

The crisis of subjectivity in the critical discourse

We are going to present the main tenets of critical theory based on the philosophy of Theodor W. Adorno and Max Horkheimer. The role of critical theory, in their view, consists in two aspects. The first concerns the demystification of mythical assumptions of the past, which amounts to a contestation of the Enlightenment dialectic, where the authors point out a number of ambivalences of modernist thinking. They concern the transition from what is rational to what is irrational. The whole aims to demonstrate the weakness of the Enlightenment doctrine of Reason, which defines reality in a holistic way. The criticism of the Enlightenment dialectic is related to the accusation in regards of the denial of metaphysics, as a domain cementing the existing order, and at the same time unifying the reality and thwarting any attempts at innovation. It is a philosophical domain that has been appropriated by the bourgeoisie, in order to maintain the status *quo*. The second area of critical philosophy of the Frankfurt School includes a series of accusations against the modern civilisation, mostly coming down to the fight against the mass culture. They criticise a society in which the human value is "measured", which leads to the destruction of individual subjectivity and homogenisation of the entire culture. It is the division of labour and the dominance of "exchange value" that led to the collapse of the ideas of the Enlightenment. That area will not be central to this study.

Both authors, in their work *Dialectic of Enlightenment* indicate the consequences of the utopian assumptions of modernism. People living in this era, opposing the cultural or religious myth, unconsciously fell into the arms of another myth – the myth of Reason. This rational tool, aiming to make a man truly free and happy, led to a distortion of the idea of emancipation and its subsequent instrumentalisation. The practical and utilitarian directives implementing the idea of Reason absorbed the theoretical ideal of Subject, and the whole project of an enlightened society was reduced to a status of a scientific utopia. Therefore, rational solutions, which were originally to free man from the shackles of nature and mythical thinking, led to the emancipation of Reason itself³. The process of self-reference of Reason influenced the Self of man, which was transformed into a transcendental or logical subject. And thus the search for the human Essence using all-powerful reason, led to, paradoxically, opposite effect than its original aim. This happened because individual work in a capitalist economy underwent bourgeois division of labour, which necessarily leads to self-alienation of the empirical man, forced to physically and mentally adapt to technical equipment⁴. Subjectivity is crushed by the overwhelming rules of the system, imposed by Reason. The mass of ignorant people, entangled by the industrial society in collective work, is subject to reification. People wanting to break free from the violence of nature, succumbed to the violence of the system⁵. It is therefore appropriate to ask, how did the alienation of man from nature occur?

To answer this question one needs to outline the basic epistemological principles of the representatives of the Frankfurt School. The critique of the

³ A. Męczkowska, *Podmiot i pedagogika: od oświeceniowej utopii ku pokrytycznej dekonstrukcji*. Wrocław 2006, p.116

⁴ M. Horkheimer, T.W. Adorno, *Dialektyka oświecenia (Dialectic of Enlightenment)*, translated by M. Łukasiewicz. Warszawa 1994, p. 46

⁵ Ibidem, p. 55

Enlightenment is based on the rudimentary assumption that there are no objective facts, and that we only know historically and socially rooted events. The epistemological subject is passive in the process of examining the object of knowing. The general concepts we use are manufactured in the process of collective human practice. Therefore, it is the society as a whole that is an active participant in the production of concepts. Adorno and Horkheimer blame the modernist thinkers for breaking the bond between man and nature, caused by the absolutising anthropomorphisation of the Enlightenment.

The Enlightenment always thought that anthropomorphism, the projection of subjectivity onto nature, was the foundation of myth. Supernatural phenomena, ghosts and demons are mirror images of people who are frightened of nature. The multitude of mythical characters can be thus reduced to a common denominator: the subject. Oedipus' answer to the riddle of the Sphinx: "Man", is repeated as the stereotypical message of the Enlightenment, regardless of whether in any given case it concerns a piece of objective meaning, an outline of some order, the fear of evil powers, or the hope for salvation.⁶

Such far-reaching process of anthropomorphisation in the discourse of the Enlightenment makes man seem a better, more distant part of reality than nature is. As a result of the degradation of the position of nature in the world, nature becomes the object of exploitation: in order for man to live with dignity, he must use natural resources in accordance with his needs. The Enlightenment gives man the dominant position in the world, and he starts to treat nature in an instrumental way, which reduces his task to describing, explaining, measuring and using nature for his own purposes. However, as the time passes, when Reason begins to turn against itself, man is returned to the natural order, and thus also becomes the object of exploitation.⁷ The representatives of the Frankfurt School call that state of man "being pushed" into the instrumentally treated natural world reification, after Marx. This process is understood here as the dissonance between self-constituting subjective consciousness of individuals and the anonymous reality of social bonds. The desire of the Enlightenment Reason to rule over nature and man himself led to the internalisation of the subject.⁸ This overwhelming need for control over external nature and the internal human world meant that people began to renounce their own instincts and desires. Dominated by the idea of subjectivity, they get lost in their artificial morality, produced by Reason.

It should be emphasised that critical theory as presented by Adorno and Horkheimer, started, but also ended with this broad critique. The Frankfurt thinkers, apart from their negative dialectics, did not offer anything. Their theory, concerned with tracking contradictions, does not consider adopting such a method as a model for explaining reality, as this could be associated with the Enlightenment theories of everything.⁹ Another representative of this school, Jurgen Habermas, presents a slightly different approach.

⁶ M. Horkheimer, T.W. Adorno, *Dialektyka oświecenia*, op. cit., p. 22

⁷ L. Kołakowski, *Główne nurty marksizmu. Powstanie – Rozwój – Rozkład*. Londyn 1988, p. 1088

⁸ A. Męczkowska, *Podmiot i pedagogika...*, op. cit., p. 119

⁹ L. Kołakowski, *Główne nurty marksizmu...*, op. cit., p. 1075-1076

Jurgen Habermas was also a representative of the Frankfurt School, but unlike his predecessors, he developed a new scientific theory based on the negation of the existing order. He agrees with his predecessors in recognising the failure of the Enlightenment project, but he goes further, and attempts to revive and complete the idea of the Enlightenment. To achieve this, he re-conceptualises the definition of Reason. The essence of the Enlightenment project rescue lies in the transfer of the *locus* of Reason from being anchored in the Subject to the inter-subjective realm.¹⁰

The primary aim of Habermas is the discovery of rationality which combines theoretical and practical reason, recognises the meanings of objects, and generates action goals, in relation to which this epistemological power is not neutral.¹¹ The dogma of science free from the influence of the individual and the social structure is one of the Enlightenment myths which led to the collapse of the mission of the great liberation of humanity. Habermas presents the concept of knowledge-constitutive vested interests which forms the justification for the emancipatory possibilities of critical theory. The goal of this treatment is to restore the proper critical potential, which had been lost in the defeatism of Adorno's and Horkheimer's historiosophy accepting the irreversibility of instrumentalisation of Reason.¹² Habermas distinguishes three interests: technical, practical and emancipatory.¹³ The last of the interests is associated with the understanding of one's own Self and the different ways of thinking about the world, allowing the individual to achieve autonomy and to develop a reflective approach to understanding of other interests. Sciences based on this interest are rooted in critical theory, which allows for gaining knowledge of the reality as it is. An example of a specific field leading to emancipation is psychoanalysis. Thus, it's the reflection that is the correct source of emancipation, and not, as Marx stated, work. This approach to social order is an attempt to formulate a new definition of rationality, free of doctrinal weaknesses of the Enlightenment Reason. This led to the emergence of the notion of communicative reason, realised using the medium of *speech*.¹⁴

In order to restore the splendour of critical theory, developed within the communication paradigm, Habermas had to first refute the pessimistic hypotheses of his predecessors regarding the instrumentalisation of Reason. In order to achieve this, he distinguished two types of aspects of social life, where each of them is assigned a different type of rationality. The first is work with a technical-technological rationality, the second is interaction, which corresponds to ethical-social, or communicative reason. Between them there are various processes of social learning, stimulated by the appropriate cognitive interests.¹⁵ This dichotomous categorisation of rationality is not as one-sided and cognitively poor as the Adorno's and Horkheimer's perspective was. Habermas draws attention to the fact that the

¹⁰ A. Męczkowska, *Podmiot i pedagogika...*, op. cit., p. 151

¹¹ L. Kołakowski, *Główne nurty marksizmu...*, op. cit., p. 1098

¹² A. Szahaj, *O komunikacyjnym zwrocie w teorii krytycznej Jurgena Habermasa* (in:) *Dyskursy rozumu: między przemocą i emancypacją. Z recepcji myśli Jurgena Habermasa w Polsce*, Ed. L. Witkowskiego. Toruń 1990, p. 135

¹³ T. Benton, I. Craib, *Filozofia nauk społecznych...*, op. cit., p. 133-134

¹⁴ The use of this term needs to be related to the differentiation of human utterances proposed by Ferdinand de Saussure between language (*langue*), i.e. the general structure regulating utterances and speech (*parole*), being the communication activity of specific individuals.

¹⁵ A. Szahaj, *O komunikacyjnym zwrocie w teorii krytycznej...*, op. cit., p. 136

existence of the human species is not based solely on its instrumental behaviour towards nature, but also on the differently operating communication structures, i.e. social integration, socialisation of individuals and cultural reproduction.¹⁶ In this perspective, the focus of the discussion of reason moves from the possibility of acquiring an objective knowledge of nature and developing methods of effectively subjugating it, towards the problem of achieving inter-subjective consensus. Thus, the subject considered in his relationship with the objective world, which relationship can be imagined or manipulated (as Habermas' predecessors demonstrated) loses importance while the inter-subjective relationships, established by individuals able to speak and act, gain importance.

The category of communicative reason allows for the return to the emancipatory ideas of the Enlightenment, from which the odium of instrumentalisation has been removed. Now, rationality does not have a metaphysical, transcendental character. It resides in *speech*, which is non-arbitrary and empirically recorded. The mediation of reason through language allows for the reduction of the pernicious influence of ideology. And then, social progress no longer requires the dialectic of violence, but it is possible thanks to the immanent rationality of *speech*.¹⁷ It is achieved by arriving at an inter-subjective consensus emerging thanks to the influence of reason. Rationality mediated by communication is measured by the ability of participants of the interaction to propose claims which can be inter-subjectively accepted.¹⁸ For comparison, rationality centred in the subject aims for truth and effectiveness, in order to control all the relationships, which leads to violence and manipulation.

In the communication paradigm, consciousness is born at the point of internalisation of the conversation, thus the dialogue comes before Self. Communication is a prerequisite for the creation of the subject. Subjectivity in this sense is not equal to an "individual" and should be understood as a network of interpersonal structures where the individual is only a transitory element.¹⁹ Empirical man thus conceptualised is a necessary part of the structure necessary for the existence of subjectivity, which is created on the principle of separating it from the whole system. Communicative rationality is not assigned to anyone specific, but it is anchored in the "inter-subjective practice of establishing, transferring and reviewing meanings itself".²⁰ Therefore socialisation precedes individuation.²¹ The consequence of this assumption is acquiring the subject after "social training." Therefore, man becomes free when some limitations are applied to him. Internalisation of mechanisms of social control by the individual and gaining awareness of being an heir of a culture gives rise to a conscious and free Self. An individual familiar with the reigning canon of a particular cultural circle it is able to change it.

The shift of critical theory in Habermas' terms towards the language becomes a programme for "healing" the Enlightenment Reason and for the continuation of the mission of that era. However, the "internalisation" of rationality in *speech* deprives it

¹⁶ Ibidem, p. 139

¹⁷ Ibidem, p. 142

¹⁸ S. Wróbel, *Władza i...*, op. cit., p. 366

¹⁹ Ibidem, p. 338

²⁰ Ibidem, p. 354

²¹ Ibidem, p. 387

of its absolutist character, while not pushing toward relativism.²² This treatment led the thinker on the road to a quite sophisticated pragmatism which assumes that something is right if it can be agreed upon.²³ All disputes are to be resolved via inter-subjective communication, which involves rationality mediated by *speech*, and the final result is consensus. It constitutes the actual social goal whose realisation is made possible by the function of the language itself.²⁴ The unifying role of *speech* leads to the occurrence of inter-individual consent. That is how similarities and differences are found in the culture.

The subject in the educational process

The reconstruction of the views of the Frankfurt School in terms of the constitution of subjectivity will allow for a theoretical analysis of the proposed hypothesis, which assumes a progressive Machiavellisation of the society in which the education system is a carrier of that trait.

The hypothesis itself fits perfectly with the essence of the above-described thinking, because it is an attempt to demystify the illusory conviction that the education system makes people educated. We understand the education process according to the definition of Bogusław Śliwerski as the totality of the multi-dimensional processes and activities encompassing the area of education and upbringing of individuals and social groups.²⁵ Thus, such broadly understood education should equip a person with moral and ethical competences, knowledge and skills. This demystification treatment, in the presented theoretical terms, is seen as a possibility of emancipation. One should ask: How, in the light of the above diagnosis, can liberation be achieved, and where should its source be? The key to liberation from the system perpetuated by the process of education is education.²⁶ Adopting this paradoxical proposition allows for a conscious revision of the ills of the system, aiming at its correction. Another option in the face of such threats would be an abolishment of the school system. However, such an anarchist solution is not acceptable in the emancipation model, as it would eliminate the process of transmission of culture, which is necessary for socialisation, and this in turn is the source of individuation (achievement of subjectivity).

A critical approach, supported by empirical research, will potentially expose the weakness of the education system, which should make people free, and geared to communication, rather than simple utility, which takes place in Machiavellianism. Greatly simplifying, it can be stated that in terms of Habermas something is right if it can be agreed upon, and in Machiavellianism something is right if it favours me. The morality of the Renaissance thinker is a political project, only for the selected, for the rulers. An attempt to transpose such a project onto morality applied to large social groups is a break with the original intention of Niccolò Machiavelli, which was elitist in its approach and clearly unacceptable in a modern democratic society, due to the objectifying nature of interpersonal relations presented using "the lion and the fox"

²² Ibidem, p. 363

²³ T. Benton, I. Craib, *Filozofia nauk społecznych...*, op. cit., p. 136

²⁴ A. Męczkowska, *Podmiot i pedagogika...*, op. cit., p. 152

²⁵ B. Śliwerski, *Edukacja* (in:) *Encyklopedia Pedagogiczna XXI Wieku*, Vol I, Ed. T. Pilch. Warszawa 2003, p. 905

²⁶ T. Szkudlarek, *Pedagogika krytyczna* (in:) *Pedagogika*, Vol I, op. cit., p. 366

model. In critical theory, the subject mediated via *speech* allows for avoiding relativism and manipulation.

The understanding of Machiavellianism adopted by the authors of this paper is associated with the psychological interpretation of this personality trait correlated with psychopathy. In the past, on the basis of this interpretation, a number of works appeared in the area of social sciences, using such a view of Machiavellianism. We are aware that in modern philosophy the ideas of Machiavelli are not perceived as amorality. He didn't separate ethics from politics – he recognised both these value systems, but as disproportionate, resulting in his praising of immoral behaviours which were right from a political point of view, whose focus is on the values of security and social balance. Therefore, we are not dealing with the apotheosis of manipulative and psychopathic behaviours: they are permitted, but in rare cases, and only in the name of another good, which is the state.

It should be emphasized that the project of Niccolò Machiavelli, because of its strictly political nature, does not refer to any objective reference point, e.g. law, nature, state, or God. However, it may lead to similar consequences in terms of reification of human relations. The free-market economy system favours efficiency, resulting from the Machiavellian "ethics" on the individual scale. Mercantilism, promoted in economic relations, increasingly affects the actors of the education system. There is a similar mechanism here as in the *Fable of the Bees* of Bernard de Mandeville, whose chief thesis is that the sum of individual wickedness drives the economic machine. A question should be asked: what can result from adoption of such ethical standards in the education system?

Generally, a Machiavellian personality, understood in the paradigm developed by psychology, can be characterised as a syndrome consisting of several main characteristics: a negative image of the world (the world is an arena of struggle, people are bad, focused on manipulating and violating moral norms, thus deserving ill-treatment); utilitarian treatment of moral norms (knowledge and understanding of moral norms, but selective acceptance of norms conducive to personal goals, and violation of universally accepted norms); negative attitude to other people (ignoring the needs of others, objectification of others), low willingness to engage positive emotions in relationships, self-centred motivational approach (determined by the need for success in competition with other people, depreciation of their needs and goals); resilience and emotional coldness (*cool syndrome*) maintained in conflict situations. Machiavellians have the ability to intellectually analyse conflict situations, due to their low emotional involvement, which helps them to achieve their own goals, which is helped by the lack of empathy. The research undertaken by the authors justifies the conclusion regarding the process of transmission of Machiavellian patterns of behaviour in the process of education and justifies the need to analyse the phenomenon of transmission of Machiavellianism in educational relationships from the perspective of the developmental significance of Machiavellianism: models of Machiavellian behaviour creating certain patterns of behaviour and personality deficits in the young generation. The correlation analysis carried out using Pearson correlation coefficient showed that the variables X (LEVEL OF EDUCATION) and the variable Y (LEVEL OF MACHIAVELLIANISM) significantly statistically correlated with each other ($r = 0.255$; $p < 0.01$) [...]. Source: Own research.²⁷

²⁷ L. J. Świeca, E. K. Wysocka, *Machiawelizm edukacyjny w kontekście bezpieczeństwa podopiecznego*

In addition to statistical analyses, the data obtained was subjected to exploratory data analysis.

Data mining as a tool for extracting knowledge

The development of information technology has led to a high ease of acquisition, collection and storage of various types of information within virtually any field. Information systems that gather data have become widely available, and the data collected varies widely. ICT systems can be used to collect data about behaviour, as for example in the case of storing data on consumer behaviour in sales systems.²⁸ ICT systems can be used to collect data on Machiavellian behaviours. Regardless of the nature of the collected data sets, they can provide a valuable source of interesting, important, useful and non-trivial information. Extraction of such information is one of the leading research trends both within computer science itself and in fields related through the specific characteristics of the data, in the present case, research in the broadly understood field of psychology.

Data sets can thus be a source of knowledge, describing in a generalised manner the patterns trends, similarities and relationships found in the analysed data sets. Extraction of this kind of knowledge is the main objective of the research area described as knowledge discovery in data.²⁹ Extraction of these useful and non-trivial relationships appearing implicitly in data sets can be variously defined, and existing methods can be variously classified. Knowledge discovery is a concept of a general nature and covers the entire process of knowledge discovery, consisting of a series of steps leading from the raw data to the patterns discovered in them. These steps include, among others, cleaning, selection, integration, and transformation of data. One of the stages of knowledge discovery is data mining. It is the key element of knowledge discovery. The other stages of this process are carried out in order to prepare data and enable appropriate representation, interpretation and visualisation of the discovered knowledge.

The authors, in the article *Machiavellianism Classifier – extended inductive inference; rough set³⁰ theory³¹* attempted to assess the utility of exploratory analysis in the studied area. The source data contained implicitly expressed knowledge of the level of Machiavellianism in the group included in the pre-pilot research. As part of the study, an attempt was made to extract this knowledge and store it in an explicit form, using a representation in the form of decision rules. These rules have been used to build an experimental version of the classifier, the aim of which was to predict the level of Machiavellian behaviours in the analysed sample. The study allowed for, on the one hand, a positive assessment of the possibilities of using data mining to study Machiavellian behaviours, on the other hand, helped to identify interesting new research problems.

w komunikacji społecznej – próba diagnozy, „Przegląd Naukowo-Metodyczny Edukacja dla bezpieczeństwa”. 2014, 1(22), p. 307-326

²⁸ T. Morzy, *Eksploracja danych*. Warszawa 2015, p. 25-32

²⁹ Z. Pawlak, *Rough sets and intelligent data analysis*, Information sciences 147.1 2002, p. 1-12

³⁰ Z. Pawlak, Rough sets, International Journal of Computer & Information Sciences 11.5 1982, p. 341-356

³¹ L. J. Świeca, R. Simiński, Klasyfikator makiawelizmu – rozszerzone wnioskowanie indukcyjne; teoria zbiorów przybliżonych (rough set theory), „Przegląd Naukowo-Metodyczny Edukacja dla bezpieczeństwa. Poznań” (in print – 2/2016)

The first is the problem of obtaining data for the data mining process. It is obvious that in order to obtain data that can be considered representative, wide and easy access to the tool used for data collection must be ensured. Designing, creating and implementing an appropriate data collection platform in the form of a website seems to be the ideal solution. It is a project with a predictable degree of technological complexity and a predictable amount of effort required. However, the important issue is to develop a concept for encouraging users to use the platform. Ostensibly, it seems that such a platform should be a questionnaire survey platform. How to encourage, however, the members of the target group to participate in such surveys? A large part of the population is tired of surveys, some people even automatically close the windows of applications inviting them to participate in research. The authors of this paper believe that the platform for data collection should use other means to encourage participation. Instead of asking for participation in a survey, the user is encouraged to take part in a quiz, in which the user will be able, for example, to test their personality traits. A user will of course be informed of the possibility of anonymous data being collected. The quiz will be designed so that in the process of completing it, data essential for the study of Machiavellian behaviours can be collected. The quiz provides a reward mechanism, in the form of a response of the system. Of course, creating a script for such a quiz is not a trivial issue, there is also the danger of obtaining fake data and of the participants getting quickly bored with the quiz formula.

It is therefore worth considering the idea of developing a platform that attracts users with a slightly different formula, offering a mechanism of simple social media games, and allowing for elements of competition. It is possible to indicate a number of areas in such simple games, where the players could subconsciously employ Machiavellian behaviours, to be recorded by the system. Of course, one should still be aware of the possibility of users faking information, but the authors believe that there is a much greater danger of obtaining manipulated data through a survey or a quiz than via a game. Playing a game activates the competition mechanism, which naturally leads to behaviours that are automatic, reflex driven and not fully controlled, thus allowing for obtaining largely reliable data.

It seems, therefore, that when considering an ICT platform for acquiring data on Machiavellian behaviours, the idea of using simple social media games is worth taking into account, especially because a properly developed game script might allow for a clear identification of Machiavellian tendencies. In addition to detection, attention should also be paid to the possibility of promoting desirable behaviours. An appropriate design of the game could have a significant influence on the development of desirable behaviours and thus be educational. A well developed system of identifying users can also be used to identify pathological and dangerous behaviours, although it should be remembered that behaviours revealed in the virtual space are not always related to real behaviours, and thus this aspect should be treated with a lot of caution.

Another important research problem identified in the course of the study reported in the aforementioned paper were methodological issues related to data mining. That work aimed to discover knowledge enabling classification of the level of Machiavellian behaviours, in relation to a number of determining factors (including education level, profession, age, gender). The adopted methodology allowed for the

extraction of knowledge described with decision rules.³² Rule-based representation of knowledge is widely recognized as one of the clearest forms of recording knowledge. In fact, however, rule-based representation is a special implementation of logical systems known since ancient times. Rule-based representation owes its unflagging popularity to an interesting characteristics: it is human-readable while still yielding itself to efficient computer processing. The rules are characterised by modularity – they make up separate "portions" of knowledge that can be individually considered, and at the same time retain the ability to specifically interact in the course of reasoning, allowing for a clear presentation of the justification of that course.

The rule is usually informally written in a manner similar to a conditional statement used in programming languages, or using logical implications:³³

If premise **Then** conclusion
premise conclusion

The most common form of the rules refers to the Horn clause, where the conclusion consists of a single literal and the premise of n literals combined by the logical conjunction functor:

If p_1 and p_2 and ...and p_n Then conclusion
 $p_1 \wedge p_2 \wedge \dots \wedge p_n \wedge$ conclusion

The literals occurring in the premise and conclusion of the rule may have a very different form. A notation in the form of propositional variables, predicates, attribute-value combinations, or object-attribute-value precepts can be used. In the ongoing research, it is assumed that the source of data for exploration will be an information system, transformed into a decision table, described by symbolic and numerical attributes, with the rules resulting from the exploration created using literals in the form of attribute-value pairs.

Decision rules, mentioned earlier, are an important category of rules in this area of exploration. The conditional part of a decision rule contains a conjunction of conditions built on the attributes and values of conditional attributes that describe the objects in the explored data set. The decision part contains a decision attribute along with its value. This pair determines the object's membership of a particular decision class. Decision rules constructed for a specific set of data contain, therefore, usually the same selected decision attribute in the conclusion. Extraction of knowledge in the form of decision rules requires the analyst to indicate the decision attribute, which limits the search for systemic interconnectedness in the data. This is what occurred in the previously performed studies. In order to expand the research potential, it is proposed to extend the arsenal of used methods to include searching for association rules.³⁴ Discovering association rules originates in one of its flagship applications – basket analysis. For this reason, the description of such rules (also the formal ones) often refers to concepts related to transactions. Association rules take the general form similar to that discussed above, therefore

³² J. Stefanowski, D. Vanderpooten, *Induction of decision rules in classification and discovery-oriented perspectives*, *International Journal of Intelligent Systems* 16.1, 2001, p. 13-27

³³ R. Simiński, *Extraction of Rules Dependencies for Optimization of backward inference algorithm, Beyond Databases, Architectures, and Structures*. Springer International Publishing, 2014, p. 191-200

³⁴ D. Larose, *Discovering knowledge in data: an introduction to data mining*. John Wiley & Sons, 2014, p. 120-167

resembling decision rules. However, in the case of association rules, both the idea and the final representation are different. Their goal is to identify the relationships between subsets of attributes. Most frequently those links represent frequently recurring relationships between the attributes. The input data set contains descriptions of some cases, for example commercial transactions. The attributes and their values describe the elements in the analysed cases - for example the purchased goods.

Association rules usually take the form of an implication, with the premise containing a conjunction of literals (usually attribute-value pairs), the conclusion may also contain a conjunction of literals. The rule represents knowledge that the joint occurrence of descriptions from the premise implies a joint occurrence of descriptions from the conclusion. The conclusion of an association rule does not contain a specified decision attribute. The attribute occurring in the conclusion is discovered at the stage of generating the rules.

In conclusion, and generalising: in a classically understood decision rule the conclusion contains a single, pre-determined decision attribute and a value that determines to which decision class the object for which the premise is true can be assigned to. Association rules describe the relationships between attributes and their values and state that the occurrence of a case for which the premise is true entails the occurrence of the description from the conclusion.

Both types of rules under consideration here have two important characteristics – firstly, they can be used to develop an automatically operating classification and inference system, secondly, they provide an easy to understand and interpret mechanism of describing the domain knowledge. This latter feature is particularly important for the analysis of Machiavellian behaviours, allowing for a critical analysis of relationships extracted from the collected data.

Summary

There is, confirmed by previous research, a possibility of developing an ICT system concerning the problem of Machiavellianism. The concept of such a solution integrating a few important elements has been presented above. It is proposed to organise the data collection by utilising a mechanism of simple social media games, which the authors believe, would allow for reaching a broad young audience. It is assumed that users of the system will be able to both remain anonymous and to have an account in the system. A correctly developed game script will allow for collection of new data and for identification of behaviours on the basis of existing knowledge. The introduction of a mechanism of identifying the location of users of the system will also allow for geographical location of the identified patterns of behaviour. The proposed system, considered in the context of the Polish education system, will achieve three objectives. The research goal is to integrate a data acquisition system with the system of knowledge discovery which will help to identify and broaden the knowledge about the pathology in the education system, and the general knowledge about Machiavellianism of the studied target group. The educational purpose consists in the fact that the proposed system can identify specific Machiavellian behaviours, while allowing for an unobtrusive promotion of adequate desirable behaviours. The preventive goal presupposes that the proposed system could identify pathological and potentially dangerous behaviours. In the case of registered users there might exist the possibility of at least partial

identification and passing of information to the relevant services. The authors believe that this interdisciplinary project is an interesting proposal. The use of information technology will allow for reaching a wide range of people, fascinated by new technologies.

Summary

The authors of this paper, while observing the Polish education system, can not accept the ossified administrative structures existing in the system and the triumph of economic objectives over the human ones, the latter understood as individuals having the opportunity for self-realisation (developing one's subjectivity). We want to ask what identities an education system functioning in this way would create? A lot of attention is devoted in the literature to the problem of education. We also want to speak on this matter, for the sake of the common good which education undoubtedly is. We sincerely hope that the perception of problems in the system will lead to its repair and not its destruction.

This paper consists of two main parts. The first part presents the reconstruction of critical theory based on the philosophy of Theodor Adorno, Max Horkheimer and Jurgen Habermas, which concerns the concept of subjectivity. The notion of subjectivity emerging from the thoughts of the representatives of the Frankfurt School is then confronted with the image of man created by the Machiavellian thought, according to social sciences. This is followed by a description of the Machiavellian personality trait, based on the psychological interpretation of Machiavellianism, and not on the current philosophical interpretation. In the second part, the authors present the proposal for using computer exploration methods to identify Machiavellian behaviours. The proposed solution takes into account cognitive, educational and preventive aspects.

Key words: critical theory, subjectivity, educational Machiavellianism, ethics, morality, exploratory data analysis, computer identification of pathology

Streszczenie

Autorzy tego artykułu, obserwując Polski system edukacyjny, nie mogą się pogodzić z występującymi w nim skostniałymi strukturami administracyjnymi oraz tryumfem interesu ekonomicznego nad interesem humanistycznym, rozumianym jako możliwość jednostki do realizacji swojej podmiotowości. Pragniemy zapytać o to, jakie tożsamości może kreować tak funkcjonujący system edukacji? Problemowi szkolnictwa poświęcono wiele uwagi w literaturze. Także pragniemy zabrać głos w tej sprawie w trosce o wspólne dobro jakim niewątpliwie jest edukacja. Mamy głęboką nadzieję, że dostrzeżenie problemów w systemie, prowadzić ma do jego naprawy, a nie zagłady.

Tekst składa się z dwóch zasadniczych części. W pierwszej części przedstawiono rekonstrukcja teorii krytycznej na podstawie filozofii Theodora Adorno, Maxa Horkheimera oraz Jurgena Habermasa, która dotyczy pojęcia podmiotowości. Następnie zostanie skonfrontowany obraz podmiotowości wyłaniającej się z recepcji myśli przedstawicieli szkoły frankfurckiej z obrazem człowieka wykreowanym przez myśl makiawelizmu na gruncie nauk społecznych. Kolejno zostanie opisana cecha osobowości makiawelistycznej, bazująca na psychologicznym ujęciu makiawelizmu, nie aktualnie obowiązującej interpretacji filozoficznej. W drugiej części autorzy przedstawiają propozycję wykorzystania

komputerowych metod eksploracji do identyfikowania zachowań makiawelistycznych, proponowane rozwiązanie uwzględnia aspekt poznawczy, edukacyjny i prewencyjny.

Słowa kluczowe: teoria krytyczna, podmiotowość, makiawelizm edukacyjny, etyka, moralność, eksploracyjna analiza danych, komputerowa identyfikacja patologii.

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