On the Logical Form of Educational Philosophy and Theory

Herbart, Mill, Frankena, and beyond

Berislav Žarnić[*]

Faculty of Humanities and Social Sciences, University of Split, Split, Croatia

Introduction

The investigation into logical form and structure of natural sciences and mathematics covers a significant part of contemporary philosophy. In contrast to this, the metatheory of normative theories is a slowly developing research area in spite of its great predecessors, such as Aristotle, who discovered the sui generis character of practical logic, or Hume, who posed the "is-ought" problem. The intrinsic reason for this situation lies in the complex nature of practical logic. The metatheory of normative educational philosophy and theory inherits all the difficulties inherent in the general metatheory, but has also significantly contributed to its advancement. In particular, the discussion on its mixed normative-descriptive character and complex composition has remained an important part of research in educational philosophy and theory. The two points seem to be indisputable. First, the content of educational philosophy and theory is a complex one, connecting different disciplines. Second, these disciplines are integrated within the logical form of practical inference or means-end reasoning. On the other hand, the character of consequence relation in this field, although generally recognized as specific, represents an unresolved problem, a solution of which requires a sophisticated logical theory and promises to influence the self-understanding of educational philosophy and theory.

Kant, Herbart, Mill: from a noble ideal to an art

Immanuel Kant (1724–1804), who occasionally taught the course on pedagogy at the University of Könisberg, in total four times after receiving his professorship, envisaged the theory of education as a most desirable but difficult aim.

> An outline of a theory of education is a noble ideal, and it does no harm if we are not immediately in
> a position to realize it. One must be careful not to consider the idea to be chimerical and disparage it

---

. Berislav.Zarnic@ffst.hr

as a beautiful dream, simply because in its execution hindrances occur. (Kant, 2007:440)

In 1809 Johan Friedrich Herbart (1776–1841) was elected to the chair of logic and metaphysics, formerly held by Kant. Herbart outlined the form and content for the "noble ideal" of educational science.

> Pedagogics as a science is based on ethics and psychology. The former points out the goal of education; the latter the way, the means, and the obstacles. (Herbart, 1901: 2)

The quotation shows that educational theory is formed by the disciplinary integration, not disciplinary differentiation. Although in Herbart's works no explicit analysis of the logical form of the science of education had been given, several important aspects of it became clearly visible. Firstly, the science of education (SE) is a logical consequence of ethics (E) and psychology (P). Secondly, the consequence relation connects normative or "ought to-be/ought to-do" statements (goals) and factual or "is" statements (ways, means, obstacles), as premises, with a normative statement in the role of conclusion. Thirdly, this connection is instrumental.

The exact content of the Herbartian science of education remains underdetermined since it can be conceived in different ways. If taken in the wide sense, the science of education (SE_W) encompasses both ethics and psychology, together with their logical consequences: $SE_W = Cn(E \cup P)$ where $Cn(X)$ is the set of all and only those sentences that are logically implied by the set X. The set $X \cup Y$ is composed of all and only those sentences that belong to the set X or the set Y; the set $X - Y$ has all and only those sentences that belong to the set X but not to the set Y. If understood in the narrow sense, the science of education (SE_N) includes only the proper educational content: $SE_N = SE_W - (Cn(E) \cup Cn(P))$. If conceived in the intermediate sense, the science of education (SE_M) comprises, in addition to proper educational content, only those parts of ethics and psychology that are logically relevant, i.e., required for obtaining an educational conclusion: $SE_M = SE_N \cup \{p: p \in (E \cup P)$ and there is a q such that $q \in SE_N$ and $q \notin Cn((E \cup P) - \{p\})\}$.

John Stuart Mill (1806–1873) differentiates science from art: the former consists of assertions on matters of fact, while the latter gives precepts and is thus characterized by the prevalence of imperative mood (J. S. Mill, 1858: 588). Education is an art and, as such, inherits its logical form.

> The art proposes to itself an end to be attained, defines the end, and hands it over to the science. The science receives it, considers it as a phenomenon or effect to be studied, and having investigated its causes and conditions, sends it back to art with a theorem of the combination of circumstances by which it could be produced. Art then examines these combinations of circumstances, and according as any of them are or are not in human power, pronounces the end attainable or not. The only one of

the premises, therefore, which Art supplies, is the original major premise, which asserts that the attainment of the given end is desirable. Science then lends to Art the proposition (obtained by a series of inductions or of deductions) that the performance of certain actions will attain the end. From these premises Art concludes that the performance of these actions is desirable, and finding it also practicable, converts the theorem into a rule or precept. (J. S. Mill, 1858: Book VI, Ch. XI, p. 589)

In Mill's account art is identified with means-end reasoning, in a way which closely resembles Aristotel's description of deliberation (*bouleusis*) in *Nicomachean Ethics*, 1112b. Mill's concept of art and Hebart's concept of the science of education agree in view of instrumental connection between the conclusion and the "major premise" but diverge in regard to the source of normative force. According to Mill, any art, including education, supplies the goal by itself, while, according to Herbart, the goal of education is borrowed from ethics. The science of education in Mill's sense is a normative theory or art (SE_A) which has two distinguishable parts: educational goal/s (G), and logical consequences following from educational goal/s conjoined with a relevant descriptive science (S). The problem of exact determination of theoretical content is left unresolved, like in Herbart; a plausible interpretation may be that Mill conceives education in a narrow sense, i.e., excluding the descriptive science: $SE_A = Cn(G \cup S) - Cn(S)$.

Frankena, Brezinka, Suppes: philosophical and practical unity versus openness

Aristotle's distinction between theoretical and practical reasoning (the first one leading to the formation of a new belief and the second to a new desire or intention) was reactualized in the 20th century and the research into practical syllogism (more accurately, practical inference for it need not have exactly two premises) has been under way since 1950s. Elizabeth Anscombe (1919–2001) deemed it as one of Aristotle's best discoveries, but the one whose true character has been obscured. Georg Henrik von Wright (1916–2003) went even further in recognition of its theoretical value and assigned to practical inference a dominant position in the methodology of social sciences and humanities as the source of their methodological autonomy.

Practical reasoning is of great importance to the explanation and understanding of action. (...) the practical syllogism provides the sciences of man with something long missing from their methodology: an explanation model in its own right which is a definite alternative to the subsumption-theoretic covering law model. Broadly speaking, what the subsumption-theoretic model is to causal explanation and explanation in the natural sciences, the practical syllogism is to teleological explanation and explanation in history and the social sciences. (von Wright, 1971:27)

Practical inference plays a pivotal role both in normative theories and in descriptive sciences of man. It was in the context of revived interest in practical inference that William (Wiebe Klaas) Frankena (1908–1994) reopened the discussion on the logical form of normative philosophy of education. According to Frankena (1965), its minimal logical structure is given by a chain of two practical syllogisms, i.e., by a practical polysillogism; an example is given in Table 1. Although Frankena (1965:9) refers to Mill as the source of his inspiration, his "two-tier model" presents a reconciliatory synthesis of Herbart's and Mill's account. Frankena, unlike Mill, does not take the goal as self-imposed by the art of education but, like Herbart, as derived from wider theoretical context in which ethical considerations provide the normative source. A diagrammatic representation of the Frankena model is given in Figure 1.

The "complete normative philosophy of education" (PE), as Frankena called it, covers normative educational philosophy (EP) and educational theory (ET). Its logical form is given by the formula PE=EP∪ET, which can be further analyzed. Educational philosophy is the consequence of basic value statements or goals (V) and scientific nomological statements (S): EP=Cn(V∪S). The reduction of educational philosophy to only those consequences that do not belong to initial sets gives the set (EP|D) of normative statements on valuable dispositions, EP|D=Cn(V∪S)–(Cn(V)∪Cn(S)). Educational theory uses the reduced educational philosophy (EP|D) and couples it with relevant scientific nomological statements (S*) in order to deduce statements about valuable instrumental actions (precepts, in Mill's terminology), ET=Cn(EP|D∪S*). It is an interesting fact that Frankena takes educational theory to be determined not by three but by four sets: the set of basic value statements, the set corresponding to the reduced educational philosophy, and the two sets of relevant scientific statements. Therefore, he does not presuppose that the practical consequence (Cn) is a strongly transitive relation allowing for the removal of intermediate conclusions, i.e., the relation where Cn(Cn(X)∪Y)=Cn(X∪Y) holds. If the consequence relation were transitive, then a complete philosophy of education would be determined by the set of value statements and the two sets of nomological statements, i.e., then PE=Cn(Cn(V∪S)∪S*)=Cn(V∪S∪S*) would hold.

(P_1) NORMATIVE PREMISE (value) $\cdots\cdots$ (P_2) FACTUAL PREMISE (causality)

educational philosophy

(C_1) = (P_3) NORMATIVE CONCLUSION (disposition) $\cdots\cdots$ (P_4) FACTUAL PREMISE (causality)

educational theory
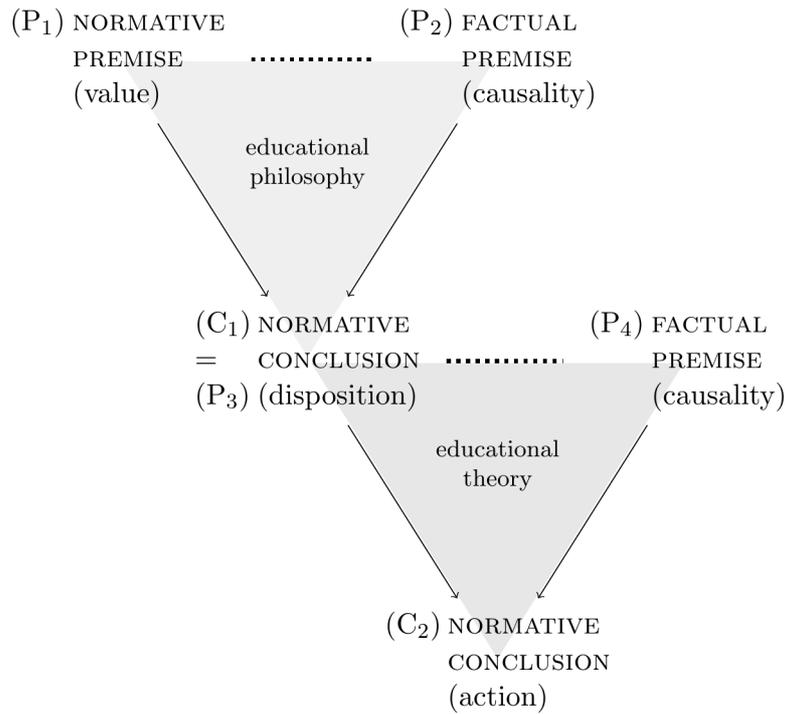
(C_2) NORMATIVE CONCLUSION (action)

Figure 1. A modified depiction of the Frankena's model. A node lying immediately below heads of arrows is a joint consequence of nodes above tails of arrows. The dotted line connects premises. The two parts in the minimal structure have been termed here as 'educational philosophy' and 'educational theory'.

(P1) Value V ought to be the case.	(P2) Disposition D is a necessary condition for value V.	
(C1)=(P3) Therefore, disposition D ought to be the case.		(P4) Action A is a sufficient condition for D.
(C2) Therefore, action A ought to be done.		

Table 1. A semi-formal example of practical polysyllogism.

The science of education takes different forms depending on their presupposed philosophical background. There have been, inter alia, hermeneutical, critical, and empirical theoretical orientations. According to Habermas (1972:308), this is not a pluralism of competing theories but of knowledge types, exemplified by empirical-analytic, historical-hermeneutic, and critically oriented sciences, constituted by the three types of cognitive interests: technical, practical, and emancipatory.

For Wolfgang Brezinka (born 1928), a representative of the empirical orientation, it is only descriptive use of language that is permitted in the science of education. The prescriptive use of language characterizes normative philosophy of education and practical pedagogics, both of which consist of "mixed normative-descriptive" statements. Frankena's concept of a "complete normative philosophy of education" results in a huge theory, the one reminiscent of Dewey's identification of

philosophy with general theory of education.

> If we are willing to conceive education as the process of forming fundamental dispositions, intellectual and emotional, toward nature and fellow men, philosophy may even be defined *as the general theory of education*. (Dewey, 2001:316)

In contrast to Frankena's all-encompassing view on the philosophy of education, in Brezinka's fragmented, three-partite composition of educational knowledge it is neither philosophy nor science, but only educational practice that can act as an integrative force (cf. Figure 2).

> To the extent that an epistemologically justified synthesis of actual knowledge and normative demands is sought, this can only be achieved in practical pedagogics. Practical pedagogics, however, cannot be said to be a unified theoretical system of pedagogical knowledge, but can rather be viewed as a praxis-oriented selection of existing theoretical knowledge on the one hand and possible valuations and norms on the other. (Brezinka, 1992:243–244)
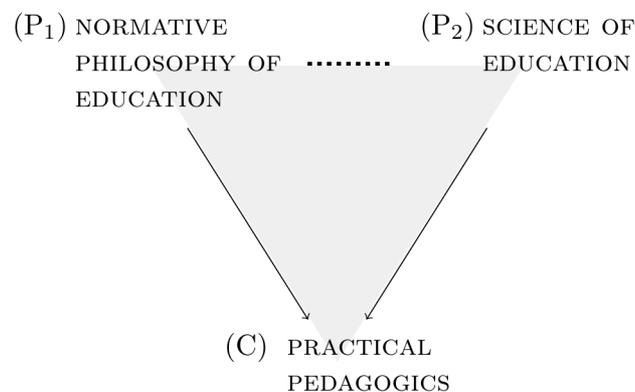
(P_1) NORMATIVE PHILOSOPHY OF EDUCATION $\cdots\cdots\cdots$ (P_2) SCIENCE OF EDUCATION

(C) PRACTICAL PEDAGOGICS

Figure 2. In Brezinka's view a practical pedagogics (PP) is a consequence of a normative philosophy of education (NP) and science of education (SE), but without a complete theoretical unification; (PP) is a proper subset of $Cn(\text{NP} \uplus \text{SE})$ but not identical to it: $\text{PP} \subsetneq Cn(\text{NP} \uplus \text{SE})$.

Patrick Suppes (1922–2014) points out the existence of conflicting normative principles. For example, the "antinomy of method" (Suppes, 1971:286) is an inconsistency of principles, one of which requires the maximization of learning and problem-solving techniques, while the other demands the maximization of content. The discovery of jointly unsatisfiable normative principles is the major task of analytical philosophy of education.

> An examination of inconsistencies [in implicit principles] can be, I believe, one of the more fruitful avenues of progress in the philosophy of education. Consistency of principles is a necessary condition that almost all men accept. It can be imposed and exploited without further analysis of the epistemological status of the principles. The close articulation of principles in the philosophy of education can have the kind of beneficial effects found in other philosophical endeavors, ranging

from the foundations of mathematics to contemporary formulations of decision theory and normative economies. (Suppes, 1971:285)

Suppes's discussion of antinomies reveals that a conclusion arrived at by a piece of practical reasoning can be defeated by adding a normative premise. This fact sheds doubt on the claim that the conclusion corresponds to a stronger type of normative judgment like a directive, precept, recommendation, instruction, advice, etc. Typically, the conclusion of a practical inference is a weak suggestion (Žarnić, 1999).

Practical consequence relation: an open question

The content of action-oriented educational philosophy and theory is of "mixed normative-descriptive" type. This is not the only difference that divides them from empirical sciences. Another, equally prominent difference lies in the nature of consequence relation.

The properties of consequence relation were for the first time explicitly defined in 1930s by Alfred Tarski (1901–1983). The Tarskian consequence relation fits the language used in empirical sciences and mathematics. It is a relation between sets of sentences of a denumerable language and its "structural properties" are: reflexivity, weak transitivity, monotony, compactness, and "explosiveness". It has been argued by a number of researchers that the consequence relation underlying the practical inference is not a Tarskian one. In particular, the non-monotonic character of practical consequence relation (the defeasibility of conclusion by premise addition) has been widely acknowledged and discussed in philosophical logic.

Instead of reporting on results achieved, let us turn towards an open question of the non-transitivity. Consider Frankena's "two-tier model"! If the consequence relation is strongly transitive, then the complete normative philosophy of education is determined by the three sets: the set of basic values (V), and the two sets of scientific statements (S and S^*); the set of intermediate conclusions on valuable dispositions (cf. C_1 in Figure 1) is superfluous and can be left out. Weak transitivity, $Cn(Cn(X))=Cn(X)$, together with monotonicity, $Cn(X) \subseteq Cn(X \cup Y)$, implies strong transitivity, $Cn(Cn(X) \cup Y)=Cn(X \cup Y)$. In the shorthand notation, if the practical consequence (Cn) is not strongly transitive, then it is possible that $Cn(Cn(V \cup S) \cup S^*) \neq Cn(V \cup S \cup S^*)$. This possibility shows that different normative philosophies of education can be built upon the same basis; it also demonstrates, assuming that normative value is inherited from basic values, that the practical conclusion must be weaker in its normative force than the basic normative premise.

There are at least two reasons for claiming non-transitivity of the consequence relation in the normative context. Texts from the normative philosophy of education usually display enthymemic

arguments, and enthymemic consequence is not transitive. Nevertheless, enthymemic arguments can be expanded to their complete form where omitted premises are explicitly stated. Therefore, we must turn to another, irremediable property to account for non-transitivity.

In its typical form action-oriented practical inference consists of three sentences: the "major premise" stating which disposition ought to be cultivated, the "minor premise" about a kind of causal relation between a type of action and the disposition, and the conclusion stating which token of an action type ought to be performed or omitted. Causal relation is usually conceptualized in terms of sufficient and necessary conditions. Consider the minimal structure of a chained instrumental reasoning (such as the one in Table 1)! Firstly, a basic value is connected to a valuable disposition via an assertion that the disposition is a precondition for the value realization. Secondly, the valuable disposition is connected to an action that ought to be done via an assertion that performance of the action is a precondition of attainment of the disposition. The transitivity of consequence relation will hold only if the two causal preconditions create a chain, but this need not be the case. For example, concatenation of a necessary condition for a value with a sufficient condition for a disposition does not yield a sufficient or a necessary condition for the value, and, so, the direct transmission of normative force from the value to an action will fail. Further research should reveal whether transitivity can be preserved against the background of a theory of causality that takes into account the nexus of the more fine-grained relations such as the relation of INUS condition (the concept has been introduced by John Leslie Mackie), which is an insufficient but necessary part of a condition which is itself unnecessary but sufficient for the result, or the relation of SUIN condition (introduced by James Mahoney et al.), which is a sufficient but unnecessary part of a factor that is insufficient but necessary for an outcome. For example, suppose the following hold: the communicative rationality is valuable; the self-reflection is a necessary but not a sufficient condition for the flourishing of communicative rationality; the use of Socratic method is a sufficient but not a necessary condition for the development of self-reflection. The Socratic method would then stand in a weak condition relation to the communicative rationality and this relation, resembling but not identical to the SUIN condition, might provide a channel of value inheritance from the communicative rationality to the Socratic method.

References

Brezinka, Wolfgang (1992). *Philosophy of Educational Knowledge: An Introduction to the Foundations of Science of Education, Philosophy of Education and Practical Pedagogics*. Dordrecht: Springer. (First published in German as *Metatheorie der Erziehung. Eine Einftlhrung in die Grundlagen der Erziehungswissenschaft, der Philosophie der Erziehung und der Praktischen Pädagogik* in 1978). doi:10.1007/978-94-011-2586-4

Dewey, John (2001). *Democracy and Education: An Introduction to the Philosophy of Education*. Pennsylvania State University. (First edition by Macmillan in 1916).

Frankena, William K. (1965). *Three Historical Philosophies of Education: Aristotle, Kant, Dewey*. Chicago: Scott, Foresman and Co.

Habermas, Jürgen (1972). *Knowledge and Human Interests*. Boston: Beacon Press. (First published in German in 1968 as *Erkenntnis und Interesse*).

Herbart, Johann Friedrich. (1901). *Outlines of Educational Doctrine*. Translated by A. Lange and C. de Garmo. New York: Macmillan Co. (First published in German in 1835 as *Umriss pädagogischer Vorlesungen*)

Kant, Immanuel (2007). Lectures on pedagogy (1803). In *Anthropology, History and Education: The Cambridge edition of the works of Immanuel Kant in translation*, G. Zöller and R.B. Louden (Eds.), pp. 434-485. Cambridge: Cambridge University Press.

Mill, John Stuart (1858). *A System of Logic, Ratiocinative and Inductive: Being a Connected View of the Principles of Evidence and the Methods of Scientific Investigation.* New York: Harper & Brothers. (First published in 1843)

Suppes, Patrick (1971). Can there be a normative philosophy of education? In *Modern Philosophies of Education*, J.P. Strain (Ed.), pp. 277-288. New York: Random House. (Also available in *Collected works of Patrick Suppes*, Center for Study of Language and Information, Stanford University: http://suppes-corpus.stanford.edu/article.html?id=96)

von Wright, Georg Henrik (1971). *Explanation and Understanding*. London: Routledge and Kegan Paul.

Žarnić, Berislav (1999). *Validity of Practical Inference*. ILLC Scientific Publications PP-1999-23. Amsterdam: Institute for Logic, Language and Computation.