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DIAGNOSTIC TOOLS  
ДИАГНОСТИЧЕСКИЙ ИНСТРУМЕНТАРИЙ

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## The Using of the Diagnostic Tool “Communication Matrix” in Working with a Child with Severe Multiple Form of Autism

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**Objectives.** At the moment, there are extremely insufficient diagnostic tools suitable for examining the communicative sphere of children with severe complicated forms of autism, and recorded practical experience of their use in organizing psychological and pedagogical support for such children. The purpose of the study is to test the diagnostic tool “Communication Matrix” in working with a child of primary school age with a severe complicated form of autism (autism spectrum disorder (ASD), moderate intellectual disability, systemic speech underdevelopment, visual impairment, atopic dermatitis), who was learning the skills of communication using the PECS image exchange communication system.

**Methods.** Diagnostic tool “Communication Matrix”. Data collection was carried out through observation of the child in free and educational activities for one year, and conversation with parents. The study is presented by three diagnostic sections and their analysis.

**Results.** At the stage of primary diagnosis, the child’s communicative characteristics were described and comments were given regarding the possibilities of taking them into account using the technique. Formed, partially formed and unformed communication skills of a child at the level of unintentional and intentional behavior, non-standard and standard communication, concrete and abstract symbols and language are identified. The objectives of correctional and developmental work are formulated based on a list of communication skills that are in the process of formation. The tasks were included in a special individual child development program and were implemented during the school day by a team of specialists, then reinforced at home with the participation of a private teacher and family members. At the final diagnostic stage, positive dynamics were noted in the development of communication at all levels. After a break (summer holidays), a regression of some skills was noted at the level of unintentional and intentional behavior, standard communication and specific symbols.

**Conclusion.** The “Communication Matrix” tool made it possible to conduct an initial diagnosis of the communication sphere of a child with a severe complicated form of autism and determine the tasks of correctional and developmental work. With the help of the instrument, changes in the child’s communicative sphere were recorded during continuous correctional and developmental education and during a break from it. Also, during the work, the advantages and limitations of the technique in relation to a specific diagnostic case were highlighted.

**Keywords:** autism; systemic speech disorders; severe multiple developmental disability (SMDD); intellectual disability; communicative development; “Communication Matrix”; psychological and pedagogical diagnostics

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## Использование диагностического инструмента «Матрица коммуникации» в работе с ребенком с тяжелой осложненной формой аутизма

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**Актуальность и цель.** Для обследования коммуникации детей с тяжелыми осложненными формами аутизма крайне недостаточно диагностических инструментов и зафиксированного практического опыта их использования. Апробирован диагностический инструмент «Матрица коммуникации» в работе с ребенком младшего школьного возраста с тяжелыми множественными нарушениями развития (ТМНР): тяжелой осложненной формой аутизма, умственной отсталостью в умеренной степени, системным недоразвитием речи и др.

**Методы и методики.** Применялся диагностический инструмент «Матрица коммуникации» в работе с 10-летним ребенком. Сбор данных осуществлялся методом наблюдения на протяжении одного года в свободной и учебной деятельности, также проводились беседы с родителями. Исследование представлено тремя диагностическими срезами и их анализом.

**Результаты.** На этапе первичной диагностики выявлены коммуникативные особенности ребенка: ограниченность репертуара нестандартной и стандартной коммуникации, частичная доступность использования символов, нетипичные мимические реакции, низкая собственная активность и др. Сформулированы задачи коррекционной работы: развитие нестандартного, стандартного и символического общения. Итоговая диагностика выявила положительную динамику в развитии всех уровней коммуникации. При непрерывной коррекционной работе: повысилась собственная коммуникативная активность ребенка, расширился репертуар нестандартного и стандартного общения, появились отдельные действия на уровне символической коммуникации. В отсутствие вмешательства наблюдалось снижение коммуникативной активности, потребность в большем объеме помощи, частичный распад навыков общения.

**Выводы.** Инструмент «Матрица коммуникации» позволил провести первичную диагностику коммуникативной сферы ребенка, определить задачи коррекционно-развивающей работы. Преимущества методики в данном случае: возможность исследования коммуникации ребенка с тяжелой осложненной формой аутизма, не использующего устную речь, на этапе первичной диагностики и для мониторинга успешности вмешательства. Ограничения методики: слабая вариативность учитываемых невербальных несимволических средств общения. Описанный опыт может быть учтен в дальнейших исследованиях эффективности инструмента на расширенной выборке, а также при выборе диагностического инструментария для обследования коммуникации детей с ТМНР и аутизмом.

**Ключевые слова:** аутизм; системные нарушения речи; тяжелые множественные нарушения развития (ТМНР); умственная отсталость; коммуникативное развитие; «Матрица коммуникации»; психолого-педагогическая диагностика

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## Introduction

When organizing corrective and developmental work with children who have pronounced intellectual developmental disorders and who cannot use oral speech, it is very difficult to carry out diagnostics and define tasks in work on the development of their communicative sphere [1; 3; 4; 8; 9]. At present, there are only a small number of suitable diagnostic tools and the experience of their use is not sufficiently described [5; 6; 11; 15]. These reasons determine the relevance of research on the communication of children with complex developmental disorders and lack of oral speech and the need to record practical experience in this area [2; 7; 10; 14; 15; 16; 18; 19].

## Methodology

Among professionals working with people with severe multiple developmental disorders, the methodology “Communication Matrix” is increasingly used [7; 10; 11; 12; 13]. The methodology allows us to identify how a person communicates and create a scheme for determining the goals of communication skills development. Its creator is Dr. Charity Rowland from Oregon Health & Science University. The tool is designed to document communication skills in children with severe or multiple developmental disabilities, including children with sensory, motor and cognitive impairments. The methodology assesses communication development at six levels: unintentional behavior, intentional behavior, nonstandard communication, standard communication, concrete symbols, abstract symbols, and language [11; 17; 20; 22].

A pilot study was conducted to test the diagnostic tool “Communication Matrix” in the work of correctional teachers with a child with a severe complicated form of autism — pupil A. — in the Federal Resource Centre for the organization of comprehensive support for children with autism spectrum disorders. The practical experience of using the tool is described and analyzed.

The following tasks were solved: primary, intermediate and final diagnostics of a child with severe complicated form of autism using the tool “Communication Matrix”; qualitative and quantitative analysis of the data was made. For diagnostic measurements we used situa-

tions of interaction of the child with teachers and other children in educational and free activity, in play interaction, during which we assessed the means by which the child expresses consent and refusal, requests, attracts the attention of an adult, asks for continuation of the action, makes a choice, answers questions, names objects and people, comments, etc. The results of the analysis were presented in the following sections.

The study duration was 12 months (September 2021 to September 2022).

**Child Description.** At the beginning of the study, pupil A. was 10 years and 4 months old, and at the end of the study she was 11 years and 4 months old. A. is studying in the 2nd grade under the adapted general education programme for children with ASD, variant 8.4 (currently in the 4th grade). The child has been diagnosed with ASD, a pronounced intellectual development disorder (mental retardation to a moderate degree), systemic underdevelopment of speech (total absence of oral speech), visual impairment, atopic dermatitis, and unspecified motor disorders.

**The primary enquiry** included: development of communication skills (mastering the maximum available repertoire of non-verbal means of communication and learning to use alternative and augmentative communication tools).

**Problem Description.** Pupil A. does not use oral speech for communication, rarely and unsteadily uses non-verbal means of communication, rarely and with serious help of an adult addresses another person with a request using the PECS card exchange system. He reacts to various external influences more often with changes in muscle tone and not always with typical facial expressions, rarely with movements, very rarely with sounds. It has been noted that A. may express some facial reactions atypically (she often smiles when she expresses disagreement, is frightened or embarrassed, i.e. this reaction cannot be interpreted as unambiguously positive; she may frown her eyebrows without expressing displeasure — in her case this is one of the variants of self-stimulation). A.’s own activity is low, there are disorders of general and fine motor skills, decreased muscle tone, balance and movement coordination disorders. In connection with the described features, special attention is required to the child’s communicative signals, which may not be obvious.

## Results

### Results of the initial survey

The first diagnostic survey was conducted in September 2021. According to the results of the survey it was found that A. has not fully mastered the patterns of non-standard communication (refusal, request for a new action, object). The repertoire of patterns of standard communication is not fully formed. The use of concrete symbols and partially abstract symbols is available, as well as the construction of a simple phrase (of 2 words) to express a request. Total score: 44 (with a maximum of 160), percentage of communication mastery – 28 (figure 1).

### Clarified request

1. Development of skills in the use of non-standard communication tools.
2. Developing skills in the use of standardized communication tools.
3. Developing skills in the use of symbolic communication tools – the use of concrete and abstract symbols.

### Intervention goals based on a refined request

1. Development of non-standard communication (use of body movements, early sounds, facial expressions, sim-

ple gestures to express refusal, request for a new action and object).

2. Development of standardized communication (using standard gestures to express agreement and refusal, to express asking for an object, making a choice, asking for a continuation or asking for something more, as well as to attract attention, answering closed questions with yes/no options).

3. Development of symbolic communication using concrete symbols (pictures or pictures depicting a specific object or action to express refusal, asking for a continuation of an action and something more, making a choice, asking for a missing object, and naming objects and people) and abstract symbols (the "thank you" gesture to express gratitude).

### Progress of work

Intervention goals were written into the learner's specific Individual Programme for Development (IPD) and implemented as part of the programme.

1. The following conditions for the realization of the highlighted objectives have also been identified:
2. The whole team of specialists participates: teacher, educational psychologist, tutor, speech therapist.
3. The consolidation of the formed skills takes place at home with parents, with other relatives, with a specialist at home.

MATRIX ID: 605113 ADMIN DATE: 9/10/2021 Total Score: 44 Percentage: 28%



Fig. 1. Results of primary diagnosis (September 2021)

Communication tool: card exchange system (PECS), hereafter referred to as a tablet.

## Results

After 7 months, in May 2022, a second cut-off was conducted using the Communication Matrix tool. Total score: 75 (maximum 160), communication assimilation percentage: 47 (figure 2).

According to the results, it was noted that A. expanded her repertoire of non-verbal means of communication to express a request for a new action, continuation (“more”), choice, and to express a request for an absent object. She started asking for new objects with partial help, greeting and saying goodbye in response, often expressing agreement and disagreement using stable gestures. A. began to request adult attention more often, confidently asking for missing motivational objects using the PECS system (one-word independently, with partial help – with a simple phrase. A. began to correctly name objects, people using concrete symbols and with partial help using abstract symbols. A. began to give one-word answers to a number of simple questions (what is it, what do you see, what do you hear, what color is it) using a card exchange system. On oc-

casion, A. used abstract symbols to communicate (symbolic labelling of an object).

## Additional results

After a break in the summer holidays, another diagnostic survey was conducted in September 2022. Due to family circumstances, during the summer holidays, work to consolidate the results of correctional and developmental classes was carried out irregularly and rarely. A. spent most of her time in free activities, resting. As a result, she achieved a total score of 63 (maximum = 160) and a communication assimilation rate of 39% (fig. 2).

After the summer holidays, the following peculiarities were noted: A. practically stopped drawing attention to herself, including using simple gestures and gaze. She did not use a means of communication to indicate her choice. Her repertoire of non-verbal signals for expressing a request had narrowed. She began to need frequent prompting to use the pointing gesture when choosing between two offered objects and often made mistakes when naming/finding objects, subjects and people when asked.

As a result, the following positive changes have occurred since the initial diagnosis: A. has fully mastered communication at the level of non-standard communication.

MATRIX ID: 605118 ADMIN DATE: 5/20/2022 Total Score: 75 Percentage: 47%

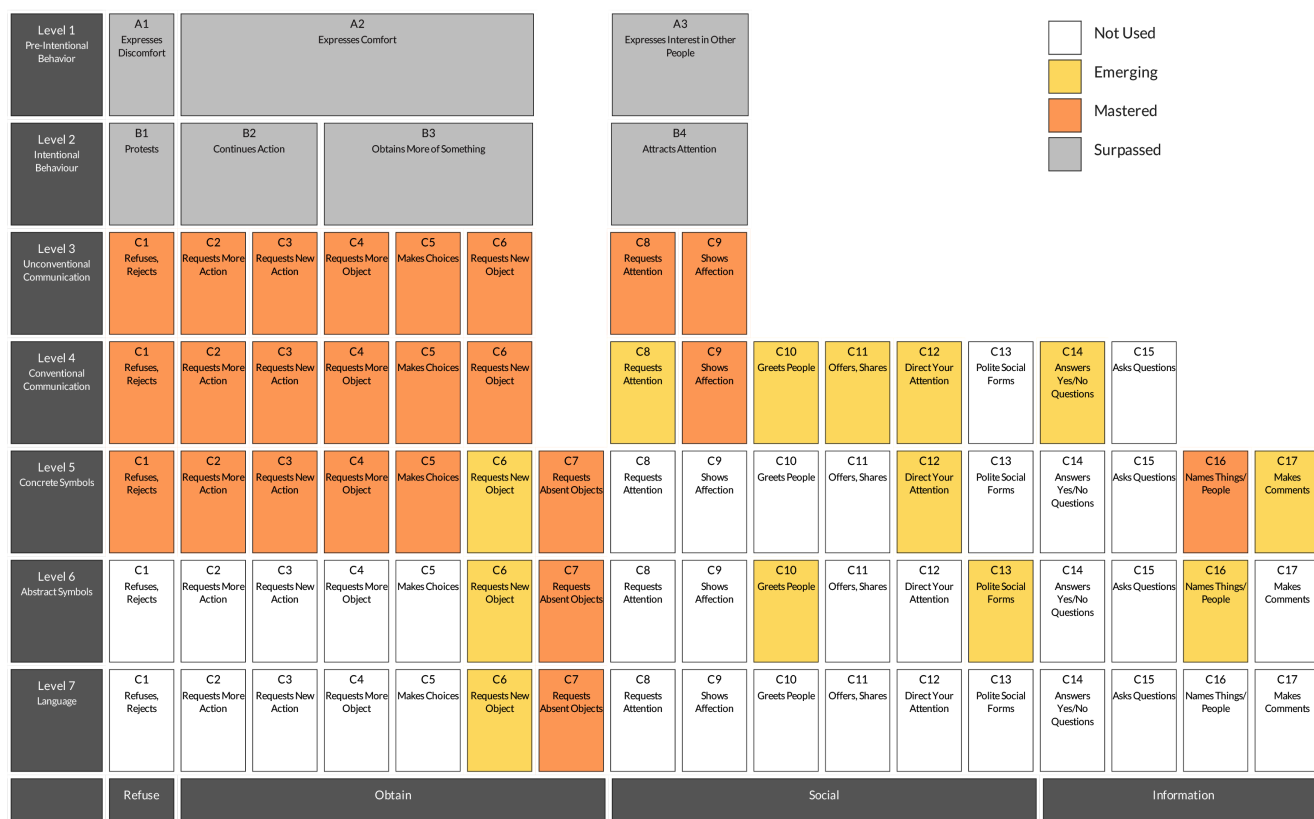


Fig. 2. Results of interim diagnostics (May 2022)

MATRIX ID: 605122 ADMIN DATE: 2/8/2023 Total Score: 63 Percentage: 39%



Fig. 3. Results of final diagnostics (September 2022)

At the level of standard communication she learnt to express refusal, a request for a new object or action, a request to continue an action. Also at this level, she has learnt how to greet another person, offer something or try to share something.

At the level of concrete symbols, A. has learnt to express refusal or desire to continue an action. She can ask for a new action and a missing object. The child has also learnt to draw an adult’s attention to something.

At the level of abstract symbols, A. learnt to ask for a missing object. Asking for a new object, greeting other people, using polite forms of communication, and naming objects also became available.

At the linguistic level (in a simple phrase using alternative and augmentative communication), A. learnt to ask for the missing object. Asking for the missing item also became available.

The “Communication Matrix” tool made it possible to obtain quite a number of measurable indicators of the level of communication of a child with severe complex autism, as well as to record their changes in the process of correction and developmental work and in its absence. Despite its limitations (inability to record individual features of the child’s communicative behavior), the tool proved to be quite convenient for designing an intervention programme.

## Conclusions

Using the “Communication Matrix” tool, an initial diagnosis of the communicative development of a child with severe complicated form of autism was carried out and the tasks of corrective and developmental work were determined, consisting in supporting and developing communication skills that are in the zone of the child’s closest development, using non-verbal means of communication and means of alternative and additional communication at the level of non-standard communication, standard communication, concrete and abstract symbols and language.

The tool also made it possible to record changes in the communicative sphere of the child included in the corrective-developmental work, reflecting the dynamics in the development of communication at all levels. If the work with the child was interrupted, regression of some skills at the level of unintentional and intentional behavior, standard communication and specific symbols was recorded.

It can be noted that the “Communication Matrix” tool provides opportunities to assess communication skills in a child who does not use speech and has difficulties using symbolic means of communication, as well as to determine the effectiveness of psychological and

pedagogical intervention aimed at developing communication skills.

As advantages of the methodology in the process of its practical use in the described case, we highlighted: the possibility of studying the communication of a child with severe complex form of autism, who does not use oral speech, at the stage of initial diagnosis and for monitoring the success of psychological and pedagogical intervention in teaching him to use alternative and additional communication.

The following limitations were also identified: the methodology does not take into account all non-verbal communicative means that can be used by a child at the stage of pre-symbolic communication. In particular, possible mimic reactions and their features are not sufficiently represented (for example, a smile is interpreted as an unambiguous manifestation of pleasure,

shifted eyebrows – of discontent, but in the examined girl these reactions, depending on the situation, can be interpreted differently); reactions of changes in body tone (for example, the examined child often does not make movements, but noticeably changes the tone of body muscles – for example, can excessively relax muscles, sliding off the chair or slipping out of hands, when expressing protest or disagreement; and tense body muscles also without making movements or in preparation for making a movement when showing interest in something).

The described experience can be used in planning further studies of the effectiveness of the “Communication Matrix” tool on an expanded sample including children with severe complex forms of autism, as well as in selecting diagnostic tools for examining the communication of children with this structure of the disorder. ■

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