

## USING YARN IN KINDERGARTEN TO DEVELOP AND ESTIMATE LEVELS OF FINE MOTOR SKILLS

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### Abstract

Currently, we have faced problems in the area of developing fine motor skills for pre-school and school children. As there has been a huge expansion of touch electronics, such as tablets in households as well as at schools, the necessity to use more fingers of a hand is decreasing. Therefore, the development of children's fine motor skills is on the downgrade. Our research plan deals with the development and testing fine motor skills in pre-school children. Usually, there are standardized sets used to test fine motor skills. The sets include a variety of testing tools, e.g. "Purdue Pegboard"- a commonly used standardized test of fine motor skills of upper limb. We consider the main disadvantage of the tools the fact that the tool is only for testing and younger children may find it uninteresting. The tool we designed in pilot testing develops and tests fine motor skills and, after its evaluation and subsequent finalization, children may take away the resulting product. In that way, children are more motivated to increase their performance and activity participation. In this part, we use wool as the main material to create a product and other materials, most commonly paper. Wool or yarn is suitable for the products practising stringing, when fine motor skills are developed. If there is a model for a solution set up, then the competence of problems solving is also partially developed.

**Key words:** tests fine motor skills, kindergarten, development of children's fine motor skills

### 4 INTRODUCTION - FINE MOTOR SKILLS AND BACKGROUND RESEARCH

Fine motor skills are the abilities to skillfully control the manipulation of small objects in a small space. That concerns all movement activities performed by small muscle groups, most often hands, but also mouth or legs. The typical feature, requested by fine motor skills to fulfill a motion task perfectly, is accuracy. (Vyskotová, Macháčková, p. 10, 2013)

ERIC - Education Resources Information Center was used for the background research as the most suitable database of articles dedicated to education. The key words "fine motor skills" were used in the search to find out about the estimation of levels and there were in total 706 hits. Using filters - description, the focus was narrowed on Preschool Education (124). As the texts of outdated articles are not available and their abstracts are really short, the restriction was extended on articles older than 2000, thus there were 17 hits in total available and 15 of them were subsequently eliminated due to their insuitability. These often dealt with standards, what shall be children able to do (for a specific country in the USA) for the right self-development.

(Lewicki, Franze, Gottschling-Lang & Wolfgang Hoffmann, 2018) comes with a fundamental finding that results of pre-school children (3-6 years) during testing their fine motor skills varies, although it is more about the variety than differentness. Therefore, results of both of the groups are comparable. The recommendation, which

was supposed to be applied in upper grades of education too (that does not always happen in the Czech Republic) is also interesting, stating that the focus shall be rather on individual skills than on gender classification and that the education between the groups shall be fair. The research was conducted in north-eastern Germany with a sample of 4251 children using the “DESK 3-6” test.

Development of children is an issue in many countries. It is necessary to understand the right development of a child, that's why it is appropriate to create standardized tests. (Anmne & Segal, 2010)., involving a high sample of children under 6 (22 819), is dedicated to the issue like this. Its focus was not limited on fine motor skills only, it also included gross motor skills and social competences. Table 3 in the article contents individual activities, which were measured. The activities were represented by simple tasks which had no further connection however useful they were for the life. They found out whether a child can take a cube out of a cup, draw circles, screw a lid, use scissors, fold a paper plane etc. And thus the larger scale activities were folding a paper plane or origami (a plane, a crane). On those grounds, there was created a scale for children specifying the activities they shall be able to manage in certain age (defined in months).

For further searching by the key words “fine motor skills” and at the same time limited on filter: Motor Development, Psychomotor Skills focused on articles from 2000 on, there were found 44 hits.

For the research and the experiment to set a standardized testing, there was interesting a finding on the development of fine motor skills. In the (Hamilton & Liu, 2018), there were tested effects of external intervention in the ordinary developing process of children. The selection of children was random, the sample of 149 children in total was divided into an experimental group (74) and a control group (75). The experimental group took 800 minutes of lessons aimed on gross and fine motor skills, spread into 16 weeks. The control group took the same time, however, they got no instructions. Children thus developed themselves. The consequence on the measuring was that the development as well as the measurements shall include quality feedback, which supports these skills, as the research conclusion states. Many of the listed researches deal with the effects of various indispositions of pupils on fine motor skills development, when such effects are expected. However, (Liu, Hoffmann & Hamilton, 2017) also pointed out the worse results of children from lower socio-economic backgrounds. Also a physical state (BMI) or human dexterity shall not be forgotten, see research 6. Although that is no aim of the research, it is referred as a warning – an influencing factor for different researches.

Despite the fact that various materials may give interesting results to levels of fine motor skills of individual groups of children, the important results for the research will be the results of children with practical tasks and materials, e.g. metal of a spoon, a pair of tweezers, pliers in testing (Rule & Stewart, 2002) or yarn – a lace for tying shoes and other materials.

## **5 FINE MOTOR SKILLS DEVELOPMENT**

Wool/yarn may be applied in fine motor skills development of children. Its main advantage consists in its soft touch and low cost and one may create interesting products using it. The elementary technique, using a yarn, is winding and threading. There are many ideas on crafts with yarn available on-line.

The basic version is not expensive – just a yarn, a paper puncher, scissors and cardboard or sturdy paper. To achieve higher quality of products, it is possible to use

for example plywood, when it is necessary to buy a prefabricated piece with holes or make a similar one. Perforated hardboard may also be an interesting variant of the material. Although the holes are evenly spaced from each other. In this case, creativity would be also developed, nevertheless it is no more possible to test fine motor skills.



Figure 1 – Source: own photo – product from the workshop (child)

Based on fine motor skills measurements and development (Lerchová, 2019), it was found out that gender plays no role in the small sample. The difference is grounded just in the difficulty of the product being made. Based on the observation, which was not mentioned in the article as it was not statistically recorded well, the attitude changed from the original one in the main hypotheses. The original hypothesis also included focus on motivating children and its increase by using products, which was a part of the measuring. A new hypothesis: The product, which is a part of the measuring fine motor skills of children, does not affect their performance.

The aim of the research remains the same – to make other products for testing and development of fine motor skills, with the focus on using yarn. Those products will be at the end finalized and children may keep them. Still, another training model would form its part and it would test fine motor skills only.

Each product would have several parts, which would be evaluated individually. The range of numbers would mean either the number of fulfilled parts or the number of errors.

The evaluation would be possible to demonstrate on the previous product, where the time to thread the material through holes would be evaluated as well as the design – that means the right colors and amount. The production would consist of the first and second testing part and also of the third, not-evaluated part coming after the product finalization. In this case it may be for example painting plywood or adding a hanging loop.

Points	0	1	2	3
Category name	TOTAL BEGINNER	BEGINNER	ADVANCED	HIGHLY ADVANCED
Range of numbers				

Based on the categories achieved, the child would be placed into the final category. It is better to evaluate each product in at least three categories to get a better assessment. The final result value is important especially for the statistics. It is not showing that much like the individual testing parts, which also serve as a feedback for training the activities with lower rating.

There are many ideas for testing, however, it would be necessary to supply testing sets too.

Weaving presents a suitable testing activity. Testing this activity would require to supply always the same weaving material and the same weaving loom, needles etc. That would bring complications in case of testing a bigger sample of children, this idea is not eliminated though.

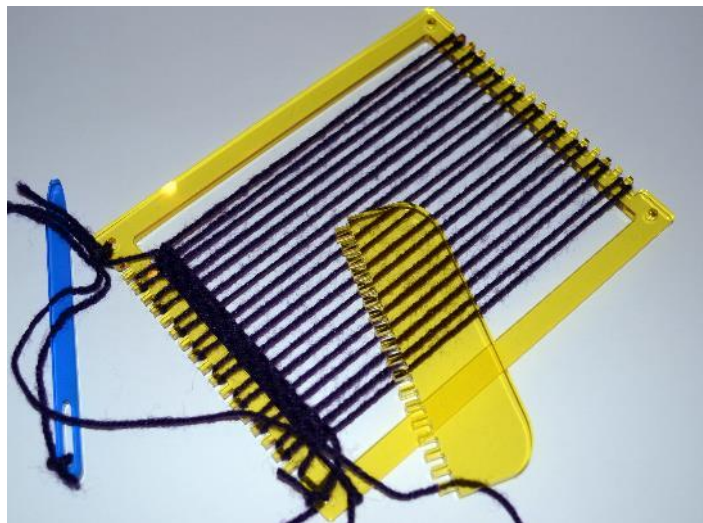


Figure 2 Lauren's Loom – Source: own photo and production, rework from <https://dxfprojects.com/6-objects/592-lauren-s-loom>

Another suitable variant is a pom pom craft to make an animal. In this case, it is possible to measure just one category – the time of creation.



Figure 3 Chick (pompons) Source: own photo and product

Source: own photo - product from the workshop

A suitable product is for example the one (Roux, 2014, p. 91) exactly specifying parameters of colors and the amount of windings. It is possible to measure the time too. Products are gradually piloted on smaller amount of children and then the most suitable ones would be selected. Yet the products which may not suite for testing would not be unheeded, as they also support fine motor skills development.



Figure 4 (Roux, 2014, p. 91)

The website “Hračky inspirované dětmi” offers a product, which may be used for testing fine motor skills too - threading. Each child gets to fold and thread a specific shape. The resulting image would not be complicated. It would consider just fine motor skills and speed of its execution.

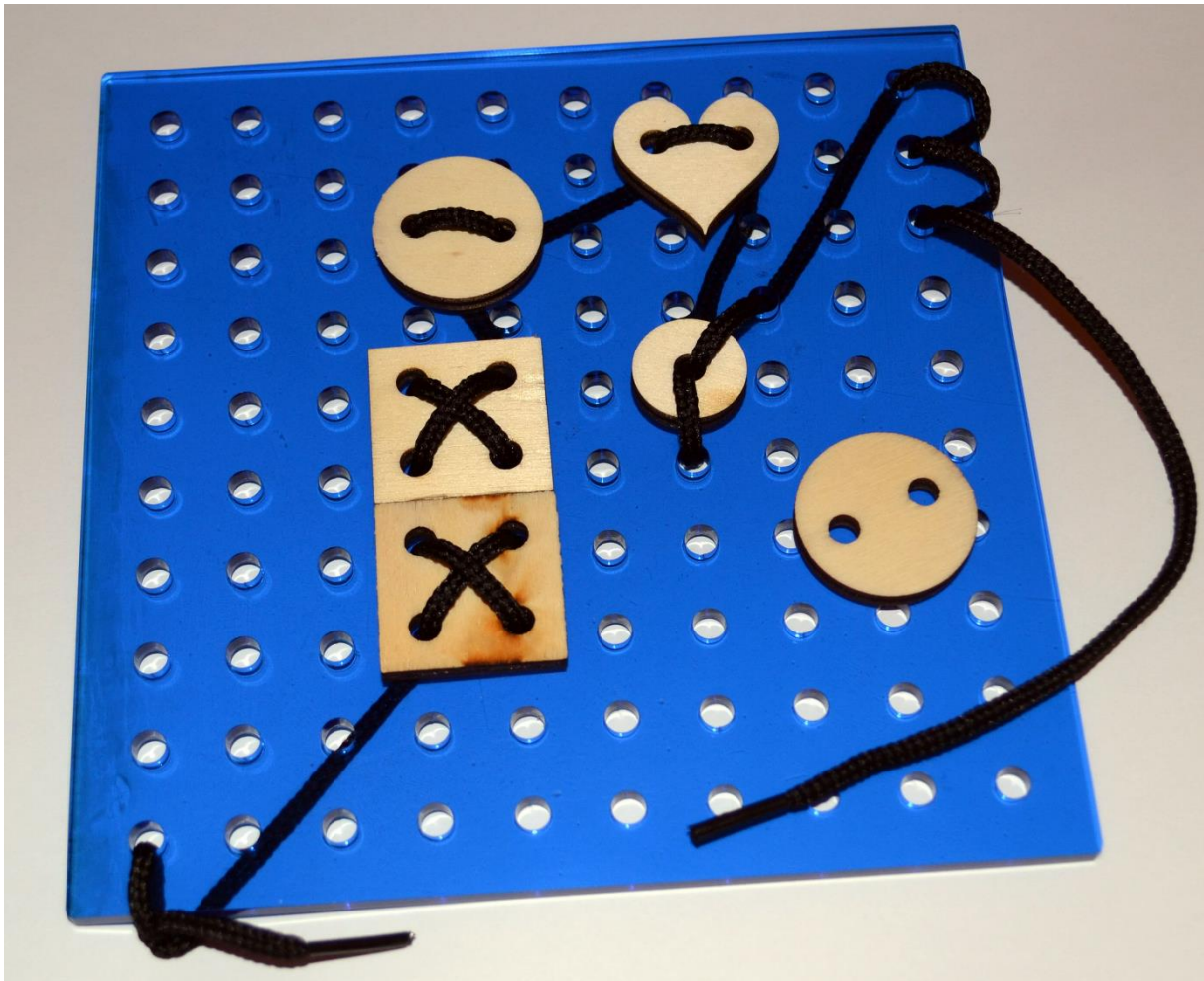


Figure 5

Source: own photo and product,  
inspiration at [https://mandala-montessori.eu/cs/plantoy/1055-deska-na-provlekani.html?gclid=EAlaIqobChMIhebv64rR5AIVRed3Ch2yrgXwEAQYBSABEGKRJPD\\_BwE#1055](https://mandala-montessori.eu/cs/plantoy/1055-deska-na-provlekani.html?gclid=EAlaIqobChMIhebv64rR5AIVRed3Ch2yrgXwEAQYBSABEGKRJPD_BwE#1055)

## 6 CONCLUSION

Based on the verification of the pictured and other products on several children, the two most suitable products would be chosen for fine motor skills testing. The result of the testing would be a product for children to take home. Based on the results gained from the previous research and other data, there would be selected also one object for testing fine motor skills. The obtained results may then meet the goal and it would be possible to find out whether there is any difference between the performance of children being tested on fine motor skills with and without a product. It would again observe any influence of gender on fine motor skills performance. Therefore, there would be available the products which do not only develop, but also test fine motor skills and others may be compared. The products shall be designed in such a way to keep the evaluation of testing objective and possible for everyone who would follow the methodology instructions. The product shall be at the same time with low material purchase costs available for most of kindergarten facilities.

## References

1. Käthe Lewicki, Marco Franze, Annika Gottschling-Lang & Wolfgang Hoffmann (2018) Developmental differences between preschool boys and girls in Northeastern Germany, *European Early Childhood Education Research Journal*, 26:3, 316-333, DOI: 10.1080/1350293X.2018.1462997
2. Anmne, Tokie a Uma A. Segal. Child development and childcare in Japan. *Journal of Early Childhood Research* [online]. 2010, 8(2) doi.org/10.1177/1476718X10367562.
3. Hamilton, M. & Liu, T. *Early Childhood Educ J* (2018) 46: 223. <https://doi.org/10.1007/s10643-017-0845-y>
4. Liu, T., Hoffmann, C. & Hamilton, M. *Early Childhood Educ J* (2017) 45: 53. <https://doi.org/10.1007/s10643-015-0755-9>
5. Rule, Audrey C. a Roger A. Stewart. Effects of Practical Life Materials on Kindergartners' Fine Motor Skills. *Early Childhood Education Journal*. 2002. ISSN ISSN-1082-3301.
6. Roux, Nicolette & Laura Marschel. *99 Fine Motor IdeasforAges 1 to 5 (Volume 1)*. 2014. ISBN 978-1500956790.
7. Lerchová, Kateřina. *Využití papíru v mateřské škole pro rozvoj a zjišťování úrovní jemné motoriky u dětí*. Plzeň, 2019. Bakalářská práce. ZČU. Vedoucí práce Petr Simbartl.

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