Evaluation of Product-Based Education Training Class at Vocational High School using the CIPP Model

Purwita Sari Rebia[1], Suharno[1,*], AG Tamrin[1] & Muh. Akhyar[1]

[1]Universitas Sebelas Maret, Surakarta, Indonesia

*Correspondence: Vocational Teacher Education, Universitas Sebelas Maret, Jl. Ir. Sutami 36A, Surakarta 57126, Indonesia

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Abstract

An employer is commonly dissatisfied with the skills of Vocational High School (VHS) graduates and suggest schools carry out learning innovations. This dissatisfaction led to the response of Warga VHS, through the implementation of a product-based education training class. Therefore, this study aims to evaluate industrial-class best practices regarding the implementation of Product-Based Education Training (PBET) in VHS, using the Context, Input, Process, and Product (CIPP) model. This evaluative method was used and conducted at the Warga VHS Surakarta, which organizes PBET industrial class. Using a purposive sampling technique, the study samples were selected, containing 41 students, 8 teachers, 2 alums, 2 parents, and 1 industrial manager. Data collection was also obtained through questionnaires, interviews, and documentation. In this process, the validity of the questionnaire items used the moment product correlation. Based on the results, students' context, input, process, and product evaluation had average scores of 4.48, 4.25, 4.39, and 4.25, respectively. Meanwhile, the teachers' average values were 4.29, 4.36, 4.23, and 4.5 for the context, input, process, and product evaluation, respectively. In this case, the entirety of these values was included in the very high category. This indicated that the implementation of PBET improved graduate skills and sustainably strengthened cooperation with the industry.

Keywords: CIPP, Vocational High School, education training, industry

1. Introduction

Vocational education conceptually collaborates with training from industry (Biewen & Thiele, 2020) and is a shortcut for students to directly enter the labour market after graduation (Abdurrahman et al., 2022). Before graduating, they are often provided with work experience through internships, regarding collaboration with the industry (Oswald-egg & Renold, 2021). This collaborative condition commonly provides the appropriate competencies supporting the industry demands. It also ensures the effectiveness of students in their respective fields (Triyono & Pratama, 2021), due to being directly educated for work readiness (Kusuma et al., 2022). However, in reality, Vocational High School (VHS) graduates are not ready to work because of a mismatch between industry needs and competencies (Choi, 2021). From this context, several problems have reportedly been identified, including the boredom of 74% of students during learning activities. This was due to the accumulation of many social lessons (Suharno et al., 2020). These problems subsequently emphasize non-industry curriculum and increased teacher administrative tasks (Nurtanto et al., 2021). Irrelevant learning materials also cause decreased learning motivation for students (Hidayat et al., 2017). In addition, most schools do not have complete classrooms (Ismara et al., 2020), with inadequate teacher competence and weak support needing prompt consideration (Suharno et al., 2018).

These learning problems mostly lead to the competencies that do not support industry needs (Yudiono, 2017), with graduates unable to demonstrate their skills while working (Geressu, 2017). This shows that many VHS students do not work according to their selected vocational field (Mahfud et al., 2020). In this case, VHS graduates often arrive in an industry that does not support their fields (Berge, 2018). Subsequently, this problem causes a high unemployment rate among them. According to February 2022 Central Bureau of Statistics (CBS) data, the rate of unemployment for these students was recorded at 10.38%, which is still the highest compared to other education levels (Sembiring, 2022). Therefore, a method of reducing VHS unemployment is the adjustment of competencies,

which effectively contribute to industrial graduate skills development, toward meeting appropriate demands (Remington, 2018; Yudiono et al., 2021). In this case, education and learning aligned with industry often develop an adequate and effective workforce (Oviawe & Ehirheme, 2020). This industrial concept application in the school environment subsequently establishes relevant experiences for students (Sudhoff et al., 2020). From this context, the graduates possessing the competencies aligning with present industry needs are produced.

A form of collaboration with industry emphasizes the establishment of an industrial class program (Prasetyo et al., 2018), which is cooperatively carried out by schools and related stakeholders. In this program, the industry designs and updates the curriculum according to the needs of the labour market and technological changes (Siddiky et al., 2020). Learning is also carried out alternately at school and in the industry (Cattaneo et al., 2022). This shows that collaborative education produces graduates with competencies according to appropriate requirements (Zavbi & Vukasinovic, 2014). In this case, they are expected to be completely absorbed into the labour market, regarding their competence. The VHS Warga Surakarta already has an industrial class program, which applies the Product-Based Education Training (PBET) model in collaboration with Bukit Makmur Mandiri Utama Ltd (BUMA Ltd). This training model facilitates students to actively learn, participate, and interact with an entrepreneurial competence orientation, to produce a product or service (Ganefri, 2013). In this model, the learning activities also involve the relativity of goods or service products to the expected competencies (Fajra & Novalinda, 2020). From this context, the developed products are commonly proposed by partner industry parties (Rouvrais et al., 2006), leading to a high commercial potential expected to increase students' entrepreneurial competence. This is in line with the goal of the PBET class, regarding the production of graduates with appropriate entrepreneurial skills.

Besides entrepreneurial competence, this learning program also develops various qualities, such as knowledge, attitudes, and skills (Hidayat, 2015). This is because learning activities are supervised by the instructors possessing these qualities, to produce valuable products (Ragan et al., 2009). Using PBET class, the activities carried out by students emphasize the assurance of the graduate competencies required by the industry (Akhter et al., 2021). In this case, the competencies following industry needs, quality improvement, and relevance of VHS graduates are the collaboration goal between schools and industry, through industrial class programs. The evaluation of the goal achieved by this program is very necessary, due to its improvement capabilities and effective performance assistance (Kipli & Khairani, 2020; Zhang, 2017). In education, the evaluation model widely used is the CIPP model developed by Stufflebeam (Bonari et al., 2018), which includes Context – input – process – product (Gokmenoglu et al., 2021). This model uses a decision-oriented approach, which helps develop decisions regarding field outputs (Tuna & Başdal, 2021). It is also a useful and simple tool to help evaluators generate critical questions during the evaluation process (Hakan & Seval, 2011). In this case, evaluators often specify multiple questions for each CIPP model component, to determine the progression of the program. The evaluation activities of the model also assist decision-making in a program (Guba & Stufflebeam, 1970). Therefore, the evaluation of the industrial class to determine the progression of the program is very important.

Based on several preliminary reports, the curriculum for implementing vocational education was not in line with the needs of the industry. This indicates that to collaborate with the school and industry, a good institutional reputation should be developed, accompanied by the availability of adequate human resources, as well as supportive facilities and infrastructure. Good teacher competence is also an added value for schools in establishing cooperation, although not all VHS meet these criteria. This subsequently causes the inability to establish cooperation with industry and organize the industrial class. Regarding the analytical urgency, the competence qualifications required by industry are always higher than the provision of the Vocational High Schools. Therefore, this study aims to evaluate industry-class good experiences (best practices) regarding the implementation of PBET in vocational schools, using the CIPP model. The results are expected to be a recommendation for the schools upholding industry-based classes, as well as improve the quality and relevance of VHS graduates.

2. Method

This descriptive evaluative study used the Context, Input, Process, and Product (CIPP) model. It was also conducted at Vocational High School Warga Surakarta in collaboration with Bukit Makmur Mandiri Utama Ltd (Buma Ltd). Using a purposive sampling technique, the samples selected included 41 students, 8 teachers, 2 alumni, 2 parents, and 1 industrial manager. Subsequently, the data collection techniques included questionnaires, interviews, and documentation. In this case, the questionnaires were distributed to the students and teachers in the Product Based Education Training (PBET) class, although the interviews were conducted with the alumni, parents, and industrial managers. These activities emphasized the determination of information about the class in the Vocational High

School Warga Surakarta. For documentation, the information documents related to the implementation of the PBET class were used. The validity test was also carried out through the product moment method, with the reliability score of the teachers' and students' questionnaires being 0.957 and 0.922, respectively. In addition, the data analysis of this instrument was conducted using the analysis of mean. The scores calculation obtained on each evaluation aspect is as follows,

$$Mean = \frac{Average\ sum\ per\ indicator}{Sum\ of\ components\ per\ indicator} \quad (1)$$

From Equation 1, the range of scores obtained became the category boundaries in making decisions. Table 1 subsequently shows the assessment criteria score.

Table 1. Assessment Criteria Score

Formula	Score Range	Category
$X \leq \mu - 1.5\ \alpha$	≤ 2.1	Very low
$\mu - 1.5\ \alpha < X \leq \mu - 0.5\ \alpha$	> 2.1 – 2.7	Low
$\mu - 0.5\ \alpha < X \leq \mu + 0.5\ \alpha$	> 2.7 – 3.3	Average
$\mu + 0.5\ \alpha < X \leq \mu + 1.5\ \alpha$	> 3.3 – 3.9	High
$\mu + 1.5\ \alpha \leq X$	> 3.9	Very high

Source: (Azwar, 2012)

A structured interview was also carried out using a guide, with data analysis and interpretation performed through an interactive analytical model from Miles and Huberman. This model contained three stages, including data reduction and presentation, as well as drawing conclusions.

3. Result

The evaluation of the PBET class implementation in Vocational High Schools is presented by describing the indicators of each component.

3.1 Context

The context evaluation for students and teachers is presented in Table 2, where their average criteria scores in the assessment of PBET class were 4.48 and 4.29. In this case, the two questionnaires were included in the very high category, indicating that the implementation of the class was carried out according to the context.

Table 2. Description of Context Evaluation Data

Evaluation	Indicator	Average Results			
		Student		Teacher	
		Average indicator	Average evaluation criteria	Average indicator	Average evaluation criteria
Context	Goal	4.3	4.48	4.31	4.29
	Physical environment	4.52		3.75	
	School culture	4.62		4.81	

Based on the documentation data, industry and education adjustments increased vocational education training development. This was supported by the interview information conducted with parents and alumni. From the results, PBET class was selected as a location to improve skills, and as a link to work in the industry. In this case, the industry provided facilities through adaptable curriculum development. It also provided facilities and infrastructure assistance, as well as met all costs of learning needs. The goal of the PBET class is to provide the ability to produce spare-part products, as needed by the partner industry. Meanwhile, the school is responsible for carrying out the process of developing education and teaching students, to produce the designs and prototypes of the spare parts

needed by the partner industry.

According to the interviews, the school provided an overview and socialization to the parents, regarding the condition of industry-standard facilities and infrastructure. For the alumni that attended the PBET class program, the physical environment was considered to be very supportive in operating the program. However, they need to adapt to the existing tools in the industry. From the results, the school culture also supported this operation. This was in line with the perspectives of the parents and alumni, which proved that school cultural support strengthened the class program implementation. This institution subsequently had good readiness to hold the class.

3.2 Input

The evaluation of the input provided to students and teachers is presented in Table 3, where their average criteria scores in the assessment of the PBET class were 4.25 and 4.36, respectively. In this case, the two questionnaires were included in the very high category, proving that the implementation of the class was appropriately carried out. Irrespective of these conditions, facility support still needs to be improved to achieve the expected program goal.

Table 3. Description of the Input Evaluation Data

Evaluation	Indicator	Average Results			
		Student		Teacher	
		Average indicator	Average evaluation criteria	Average indicator	Average evaluation criteria
Input	Regulation	4.51	4.25	4.50	4.36
	Teacher Competence	4.48		4.69	
	Access and quality of new students	4.71		4.63	
	Facility Support	3.30		3.63	

Based on the documentation data, cooperation was regulated between VHS Warga Surakarta and Buma Ltd, regarding the MoU approved and signed by both parties. In this case, the content of the MoU stated that the industry provided facilities through adjusted curriculum development. They also facilitated and provided institutional consumable equipment grants, to support the learning process. Additionally, facilities and opportunities were provided to the students, to carry out industrial work practices and meet all costs of learning needs. Furthermore, the cooperation agreement was valid for three years and extended based on both parties' affirmation. When one of the parties intends to terminate the agreement before the agreed period expiration, written notifications should be provided to the partner at least 30 days before the effective termination date.

Regarding the interviews, the teachers/instructors in PBET class should participate in the TOT (Training of Trainer). This indicated that they need to perform internships in partner industries, to obtain TOT certificates. They should also communicate with the parents about classroom learning, with students following the selection stages from the industry before completing admission. The classroom selection stages are shown in Figure 1.

Figure 1. Product-based Education and Training (PBET) Class Selection Stages

Based on Figure 1, the industry provided facility support to VHS Warga Surakarta, including study rooms, workshops, practical equipment, and present learning activities. Besides this, no additional fees were charged to the students and parents.

3.3 Process

The process evaluation provided to students and teachers is presented in Table 4, where their average criteria scores in the assessment of PBET class were 4.39 and 4.23, respectively. In this case, the two questionnaires were included in the very high category, confirming that the class implementation was appropriately carried out. However, the facility support needs to be improved to achieve the expected program goal.

Table 4. Description of Process Evaluation Data

Evaluation	Indicator	Average Results			
		Student		Teacher	
		Average indicator	Average evaluation criteria	Average indicator	Average evaluation criteria
Process	Program planning	4.46	4.39	4.44	4.23
	Program implementation	4.05		3.63	
	Program monitoring and assessment	4.66		4.63	

Based on the documentation data, the PBET industrial class program was planned with curriculum synchronization and carried out by both the school and the industry. In this case, the school notified the parents about the class. This was accompanied by the industry's recruitment preparation, which was assisted by the school. Although all students were eligible to attend this recruitment process, only those that met the requirements participated in the PBET industrial-class program. The stages of planning a cooperation program between schools and industry are shown in Figure 2.

Figure 2. Product-based Education and Training (PBET) Class Planning Stages

Regarding the interview, the industry was responsible for providing support in the research and curriculum development form. This was responsible for the teaching and learning process, as well as the achievement of educational facilities. It also provided facilities and assistance to VHS Warga Surakarta, regarding the implementation of industrial work training. In this case, the learning model was digitally and directly carried out. Furthermore, the teachers/instructors from the industry and schools conducted the implementation of learning, with more explanations performed on industrial practical and cultural activities.

The implementation of learning began with the morning assembly, accompanied by theoretical education, break, practical studies, and home gathering. After graduating from the PBET class, a certificate was provided to the students, to ensure easier job application in the industry with appropriate competencies. Moreover, they should obey the set rules in following the learning process. In implementing the industrial class program, the adoption of OJT (On Job Training) was also facilitated by a partner industry in PBET class. This was completely conducted for one month, with the instructors originating from schools and industry.

From the interviews and documentation, the task of the school in monitoring and evaluating the program prioritized the management and reporting processes. This showed that the school was responsible for carrying out the educational development process for students, leading to the production of designs and prototype spare parts needed by the partner industry.

3.4 Product

Table 5. Description of the Product Evaluation Data

Evaluation	Indicator	Average Results			
		Student		Teacher	
		Average indicator	Average evaluation criteria	Average indicator	Average evaluation criteria
Product	Learning outcomes	4.67	4.25	4.63	4.50
	Quality and relevance of graduates	3.88		4.38	
	Graduate work opportunities	4.21		4.50	

The evaluation of the products provided to students and teachers is shown in Table 5, where their average criteria scores in the assessment of PBET class were 4.25 and 4.50, respectively. In this criteria, the two questionnaires were included in the very high category, indicating that the class implementation was appropriately carried out.

Based on the documentation data, the learning outcomes owned by students in the industrial class were the certificates provided by the industry, which became an advantage for job acquisition. This allowed the PBET class graduates to obtain entrepreneurial competencies and certificates as additional points for working. Parents also supported their children to work according to the appropriate areas of expertise.

For the interviews, PBET class graduates exhibited working confidence because of the basic skills and certificates obtained from schools. The tools and materials studied were also similar to those in the industry, with most alums opting to work for experience and skill development.

Table 6. Summary of the CIPP Evaluation of the PBET Class

Aspect	Questionnaire Results of VHS Warga Surakarta			
	Student	Category	Teacher	Category
Context	4.48	Very high	4.29	Very high
Inputs	4.25	Very high	4.36	Very high
Process	4.39	Very high	4.23	Very high
Product	4.25	Very high	4.5	Very high

According to Table 6, the evaluation of the PBET class implementation on the context, input, process, and product aspects was obtained, with the average scores for students being 4.48, 4.25, 4.39, and 4.25, respectively. Meanwhile, the average scores for the teachers were 4.29, 4.36, 4.23, and 4.5, regarding the context, input, process, and product aspects, respectively. For both parties, the results obtained were included in the very high category.

4. Discussion

Context evaluation is used to determine program goals, by analyzing the needs that a program should manage (Toruan, 2017). In this process, the following aspects were studied, (a) industrial class goal, (b) physical environment support, and (c) school cultural support. Regarding the establishment of the PBET class, the goals emphasized the alignment between the industrial world and vocational education, to develop the graduates ready to work. It also provided an alternative route for underprivileged students to work directly in the industry (Guo & Wang, 2020). Moreover, the PBET class was a success factor for the government in improving the human resources quality (Fauziyah et al., 2021). This class is an alternative vocational education model relevant to the needs of students, regarding the development of knowledge, attitudes, and skills in the learning process (Hidayat, 2015). These features were in line with the goals of parents and alums, regarding the selection of the PBET class as a place to improve skills and as a link to work in the industry. Graduates also had the potential to contribute to the development of vocational education and increase labour force productivity (Waichun & Seeshing, 2022). Furthermore, the industry provided facilities through curriculum development adjusted to the needs. This indicated that curriculum and competency standards played important roles in realizing equality between vocational education graduates and the industry (Nilsson, 2010). This form of education subsequently carried out practical learning with specific industry-based curricula and competencies (Muja et al., 2019).

Input evaluation helps to make decisions and determine available resources, to achieve the best results (Poth et al., 2020). In this process, the following aspects were studied, (a) regulation, (b) teacher competence, (c) access and quality of new students, and (d) facility support. Since regulation is a rule designed by a group with a specific purpose, its contribution in the input aspect emphasized the cooperation between Vocational High School (VHS) Warga Surakarta and Buma Ltd. This was evidenced by the MoU, which was approved and signed by both parties. In this case, the consideration of teachers' competency in learning management was very necessary, with that of the students following the needs of the industry (Rusmiyati, 2019). Teachers should also be highly competent in technological developments (Indira et al., 2020), as their perceptions of students often influenced academic judgments and teaching approaches (Cho & Shim, 2013; Miller et al., 2017).

Since vocational education needs to meet infrastructure standards and provide teaching training (Mutohhari et al., 2021), the teachers/instructors lecturing in PBET classes then need a TOT certificate. This certificate is often obtained after they participate in an internship with the partner industry. The teachers should also communicate with

parents regarding classroom learning. Since PBET class is directed toward entrepreneurship, students often continue their education after graduation, work directly in the industry, or become open entrepreneurs. Therefore, accessibility and student quality need to be considered for the achievement of the program goals. Those interested in being admitted into the PBET class should also follow the selection stages determined by the industry. In this case, all students are advised to follow the admission selection activities. In this recruitment process, the challenges encountered were the limited number of students accepted to participate in the PBET class program.

Process evaluation identifies problems during program implementation, using program resources, time, and activities (Neyazi et al., 2016; Salehi et al., 2021). In this case, the industrial-class program planning, implementation, as well as monitoring and assessment were analyzed. Planning is the process of preparing the stages to be carried out regarding the achievement of the set goals (Reny Nurharisma & Kuswantoro, 2020). From this context, the PBET class planning at VHS Warga Surakarta consists of curriculum synchronization with partner industries. This synchronization effectively coordinates competencies in schools and the industry (Iktiari & Purnami, 2019). It also develops the relationship or suitability between existing knowledge needs in schools and industry (Rully et al., 2019). Moreover, curriculum synchronization involves teachers and the training centre Buma Ltd. After this synchronization process, the school provided students and parents with information about the PBET class. Regarding the academic recruitment aspect, the industry was also assisted by the school. using several related stages. After recruitment, the learning activities process was then performed.

Besides providing research support and curriculum development, the industry was also responsible for the teaching and learning processes, as well as the achievement of educational facilities. Subsequently, it provided facilities and assistance to the VHS Warga Surakarta, regarding the implementation of industrial work training. This ultimately prioritized the ability to produce spare parts, as required by the partner industry. Meanwhile, the school is responsible for educational development, to establish the designs and prototype spare parts needed by the partner industry. The learning model was also digitally carried out using Google Classroom, although it was ineffective. In this case, Microsoft Team was subsequently used, with students divided into several groups for practical learning. This was to complete the job desk design and prototype spare parts required by the partner industry. Based on these results, both parties were responsible for learning implementation. The teachers/instructors from schools also explained more about practical and cultural activities in the industry. However, the encountered challenges emphasized the inadequate participation of the industrial guest teachers in the learning process, leading to ineffective monitoring of the students.

During OJT (On Job Training) activities, students developed the designs and prototype spare parts needed by the partner industry. This focused on the analyzed learning materials, such as the development of a tooth bucket and copper hammer, namely pancanaka and alu goro, respectively. These products were often ordered by industrial partners. After the OJT activity, students subsequently performed various presentations since the goal of the PBET class was entrepreneurship. These presentations were carried out in front of 3 related examiners, namely the teachers of VHS Warga Surakarta, the Buma Ltd, and the cooperative higher education parties. This process prioritized the assessment of student learning outcomes in the PBET class, which followed and adapted to partner industry parameter standards. The assessment outputs were also used to determine student graduation for the certification applications. In this process, the graduation activity was determined by the industry, with students expected to meet the minimum completeness criteria (MCC) agreed upon during curriculum synchronization.

School graduation does not affect industrial scores, although certificates are not provided to students when they possess incorrect results and do not meet the MCC. After the completion of the assessment activities, students subsequently obtained a certificate from the partner industry. Meanwhile, the certificate from the Professional Certification Institute (PCI) was not provided, due to the difficulties in determining the Entrepreneurship PCI for the VHS level. Supervision and assessment were also carried out to determine the set goals. In this case, supervision includes monitoring and evaluation (Haryani & Sunarto, 2021), with the assessment of students' learning outcomes following and adapting to the standards of the partner industry. This assessment process is often carried out after the completion of the OJT activities.

Product evaluation identifies and assesses program achievements program (Sopha & Nanni, 2019). It also determines whether the program needs to be continued, improved, or stopped (Darma, 2019). In this process, the aspects studied included the following, (a) student learning outcomes, (b) quality and relevance of graduates, and (c) work opportunities for industrial class graduates. These aspects were subsequently used in the achievement of PBET class program achievement. This is a huge challenge regarding the quality and relevance of graduates, especially the low absorption of those in the labour market (Triyono et al., 2019). Therefore, they should be fit for work and accepted

through the skills and knowledge acquired during the PBET program activities (Engelbrecht et al., 2017). This is because PBET students often possessed more relevant skills, knowledge, and character formation than the regular class. In this case, the labour market appropriately absorbs PBET graduates.

When working in their suitable fields, these graduates are often confident due to the certificates and basic skills obtained from the school. This shows that certificates are very important in improving institutional qualities (Triyono et al., 2019). When participating in the PBET class program, students feel satisfied and are often provided with internship opportunities in the industry (Engelbrecht et al., 2017). After graduation, adapting to the work world is commonly easy for them, due to the direct acquisition of formal learning at school (Nicolas et al., 2022). Based on these results, the PBET class program is successful and should be widely adopted (A. Miller, 2020). This is due to increasing the absorption of graduates in the labour market. In this program, work opportunities are also very large, regarding the acquisition of entrepreneurial competencies and certificates as additional advantages in the industry. Subsequently, parents support their children to become entrepreneurs or work directly in industries that suit their expertise areas.

5. Conclusion

From the results, all important aspects of a program should be jointly evaluated to determine its future direction. In this study, the CIPP model provided a prescriptive and flexible framework. The results also showed that the context evaluation of the PBET class was achieved, due to the active role of the industry in providing learning facilities and infrastructure. In the input evaluation, the existing resources were used appropriately, with the activities of the process aspect subsequently conducted by synchronizing the school curriculum with the industry. Meanwhile, the product aspect performed assessments and evaluations for the students producing entrepreneurship certificates as the added value during job applications. These results proved that the PBET class was capable of producing competent graduates and strong sustainable collaboration with the industry.

Although positive results were obtained, some challenges were still observed, such as the inadequate periods used by industrial teachers/instructors during lesson performances. Therefore, learning should be fully guided by these educational actors in the school. Facility support also needs to be continuously improved for the achievement of the program goal. Several constraints were also experienced during online learning because not all students quickly adapted to the digital processes. Another challenge emphasized the non-provision of the Entrepreneurship PCI certificate, which is still unsupported at the VHS level. Moreover, no specific guidelines were observed regarding PBET classes, leading to implementation difficulties for interested schools. Based on these constraints, subsequent reports need to futuristically determine the developmental patterns of a mutually beneficial PBET class model. Special guidelines should also be established for easy implementation of the program by interested institutions.

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